EXCAVATING ENGINEER

Using an American-made ½-cu. yd. shovel and truck, advancing U. S. Army Engineers put a rock crushing and screening plant found in a local quarry to work furnishing stone for road maintenance in the invasion of France.

U. S. Signal Corps Photo

BUILT by EXPERIENCE

The largest U. S. mobile gun . . . the 240 mm howitzer . . . Into its manufacture goes the extensive experience and reputation for fine workmanship which led to the selection of Bucyrus-Erie to work with the Army on the design and production of this Axis-crushing weapon . . .

The same experience, the same skilled workmanship has been the big reason why Bucyrus-Erie placer dredges have led their field for many years. Ever since Bucyrus-Erie pioneered the building of placer dredges, its name has been the standard of excellence in dredging.

Bucyrus-Erie dredges in postwar years will continue to be "years ahead" — for into them, too, will go the unequalled experience which built their counterparts yesterday . . . and builds Axis death today.

Placer . . . Hydraulic . . . Dipper Dredges

SOUTH MILWAUKEE **BUCYRUS ERIE** WISCONSIN

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"You Sure Get STEPPED-UP DRILLING with I-R JACKHAMERS"

A JACKHAMER FOR EVERY JOB

Model	Weight Class
JB-30	30 lb.
JA-35	35 lb.
JB-4	45 lb.
JB-5	55 lb.
S-68	65 lb.
X-59	80 lb.

Stepped-up drilling means more feet of hole per shift. There is only one way to attain it—by using a rock drill which properly combines high drilling speed, easy holding, and the ability to stand up to hard work.

Ingersoll-Rand engineers have successfully designed this combination of essential qualities into the I-R line of Jackhamers.* That is why these machines are so popular with contractors, mining men, quarry operators, and the armed services. Ask any of them!

When you put Jackhamers to work, you take advantage of advanced rock drill design and reliable rock drill service. Your drilling is stepped-up and your upkeep costs are lowered. Consult our rock drill engineers for help in selecting the right size and type for your particular job. They know the local conditions.

**If it's a Jackhamer, it's an Ingersoll-Rand (the word Jackhamer is a registered I-R trademark).*

★ ★

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More pull, less slip with O-P-E-N C-E-N-T-E-R traction

Le Tourneau Super Tournapull and Carryall Scraper on Goodyear Sure-Grips

THE bigger your prime movers, the greater yardage you're handling, the more need you have for tires that won't cake up and spin.

That's why more and more contractors are specifying Goodyear Sure-Grips. This great tire's time-proved O-P-E-N C-E-N-T-E-R *self-cleaning* tread has no dead-end pockets, no mud traps to fill up.

Its big, wide, unblocked channels sluice out dirt and stones, leaving those big, massive lug bars clean and free to bite deep and pull in any going.

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Add the greater toughness of Goodyear's exclusive multiple-compounded construction, plus the extra strength of Goodyear's Supertwist cord carcass, and you get the longest-lasting, hardest working tire ever built.

Just ask the men who are using them. Once you've heard their story, you'll want Goodyears on all your units.

THE RIGHT TIRE FOR EVERY JOB

HARD ROCK LUG for all rock work

ALL-WEATHER EARTH-MOVER for drawn vehicles

SURE-GRIP for mud and marsh

Sure-Grip, Supertwist, All-Weather—T.M.'s The Goodyear Tire & Rubber Company

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GOODYEAR

THE GREATEST NAME IN RUBBER

MORE TONS ARE HAULED ON GOODYEAR TRUCK TIRES THAN ON ANY OTHER KIND

EXCAVATING ENGINEER

FOUNDED 1905

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for every construction purpose
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Ask for Catalog 44
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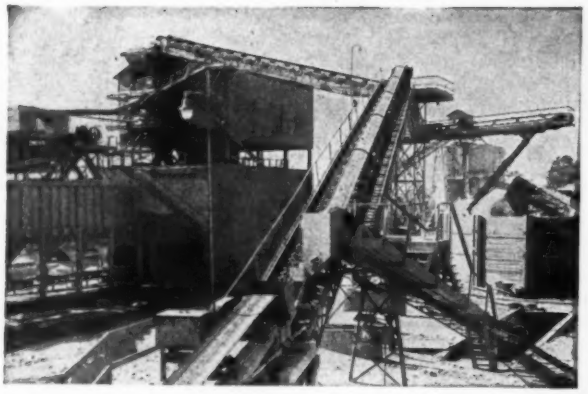

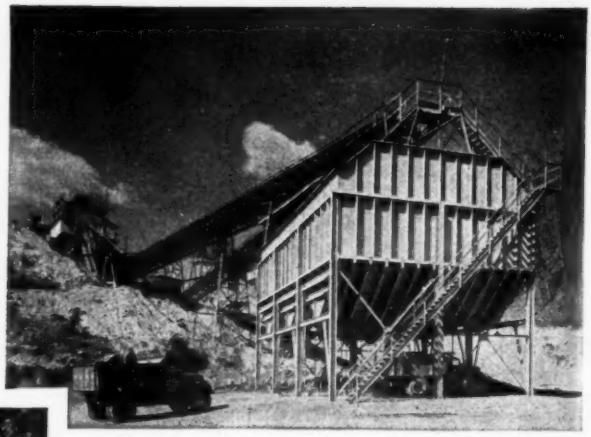

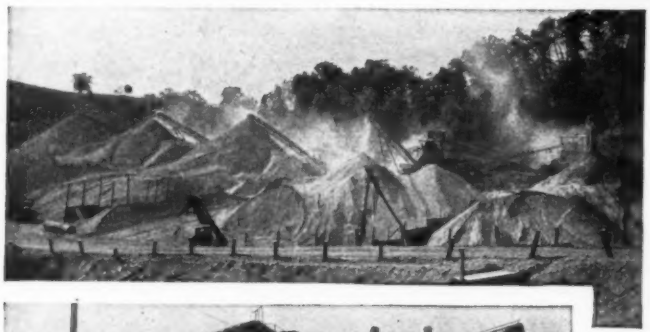

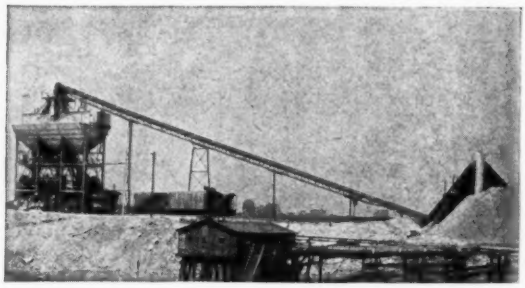

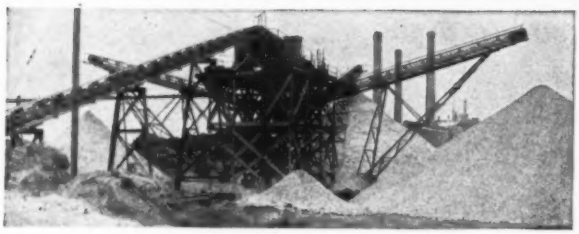

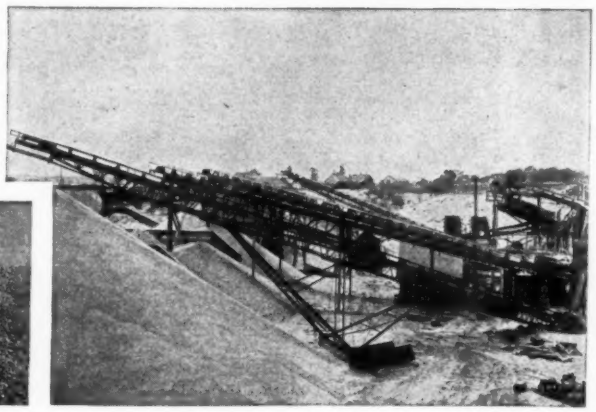

CUSTOM BUILT

With Standard Units....

Typical of the Barber-Greene concept of Standardized Sectional Conveyor construction are the installations shown here. The belt conveyors used in these plants consist, for the most part, of standard units, pre-engineered and designed for production manufacture. These standard terminals, trusses, carriers, A-frame supports, and take-ups are available in a wide range of sizes and horsepower to meet a custom engineered application.

The Barber-Greene Engineering Department will assist you in utilizing this equipment to best advantage. It is equipment that can be expanded as your plant grows merely by adding standard units. Barber-Greene Co., Aurora, Ill., U. S. A. 44-26

BARBER GREENE

AURORA, ILL., U. S. A.

Engine
No. 100,000
Already on its way to join the other Detroit Diesel 6-cylinder engines serving in America's landing craft, tanks, trucks, bulldozers and other war equipment.

10 DIVISIONS OF FIGHTING ENGINES

MONTHS ago the Detroit Diesel Engine Division of General Motors sent engine No. 100,000 off the production line to its war job. Many more have followed since. Measured as men, more than ten divisions of these six-cylinder Diesels are actively in the fight. They're in landing craft helping to crack Fortress Europe and to cut the Nips' string of islands. They're in tanks, trucks, bulldozers and all kinds of other equipment. The reasons are, these Diesels are tough and dependable. They're easy to maintain. They burn inexpensive fuel oil.

They have been tried and proved in all sorts of war jobs on every battle front. And they've been found good.

With the coming of peace these engines will be available for all the applications where America will need reliable, low-cost power.

KEEP AMERICA STRONG
BUY MORE WAR BONDS

GM
GENERAL MOTORS
DIESEL POWER

ENGINES . . 15 to 250 H. P. . . **DETROIT DIESEL ENGINE DIVISION,** Detroit 23, Mich.

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THE *Right* MODEL FOR *Every* PAVING BREAKER JOB!

CLEVELAND C11

This 58-lb. tool has a long stroke and strikes a very heavy blow. It is noted for its economical air consumption.

CLEVELAND C9

Weighs 82 lbs., and is a slugger suitable for reinforced, well-seasoned concrete. A No. 85 compressor operates two.

CLEVELAND C7

This 80-lb. model is best for all around work on paving breaking and demolition jobs. Two C7's run from a No. 85 compressor.

CLEVELAND C10

This is a smaller (35-lb.) model for light work, trimming, etc. Three C10's run from a No. 85 compressor.

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Moil Chisel | Narrow Chisel | Wide Blade | Digging | Sheeting Driver | 7" Tamper Bar | 5" Tamper Bar | Clay Blade | Clay Spade | Asphalt Cutter

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Division of The Cleveland Pneumatic Tool Co. • CLEVELAND 5, OHIO

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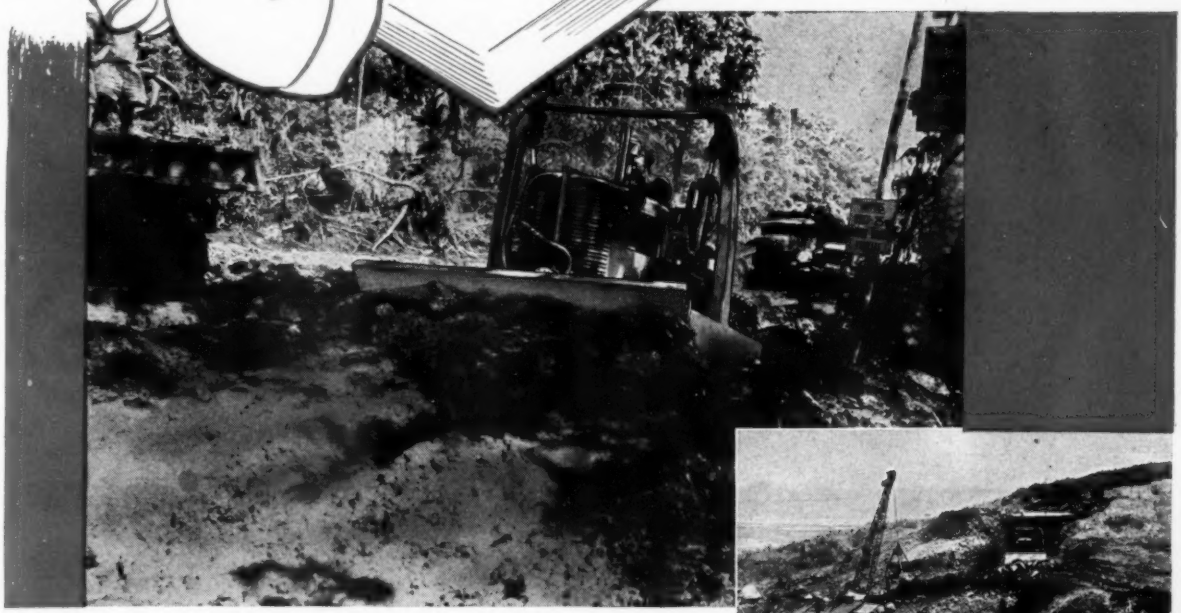
BAKERS ON THE BIGGEST CONSTRUCTION JOB IN HISTORY

—WORLD WAR II



Top: Baker building road in New Caledonia.
Center: Making fuel "dumps"; Fiji Islands.
Bottom: Dozing trees for air base; Australia.
Bakers are on every front.

So you think Boulder Dam and the Panama Canal were big jobs? They were pikers compared to the construction job of them all—World War II. More earth is being moved, more trees dozed, more roads, bridges and buildings built and more buildings razed than on any other job at any time.

It's taking an endless amount of construction equipment of all kinds, including Baker Bulldozers and Gradebuilders by the hundreds.

This *Biggest Construction Job* calls for speed—that's where Bakers come in. Powerful hydraulic down-pressure on the blade bites deep into Italian lava, Algerian sand or South Pacific coral —gets full loads faster. Too, Bakers are as simple as they look—fewer parts—easier to maintain. No wonder the boys in the Seabees and the U. S. Engineers swear *by* them—not *at* them.

After monthly war quotas have been met, a few units are left for high priority requirements. If yours is a war job, you may be eligible. See your Baker, Allis-Chalmers dealer.

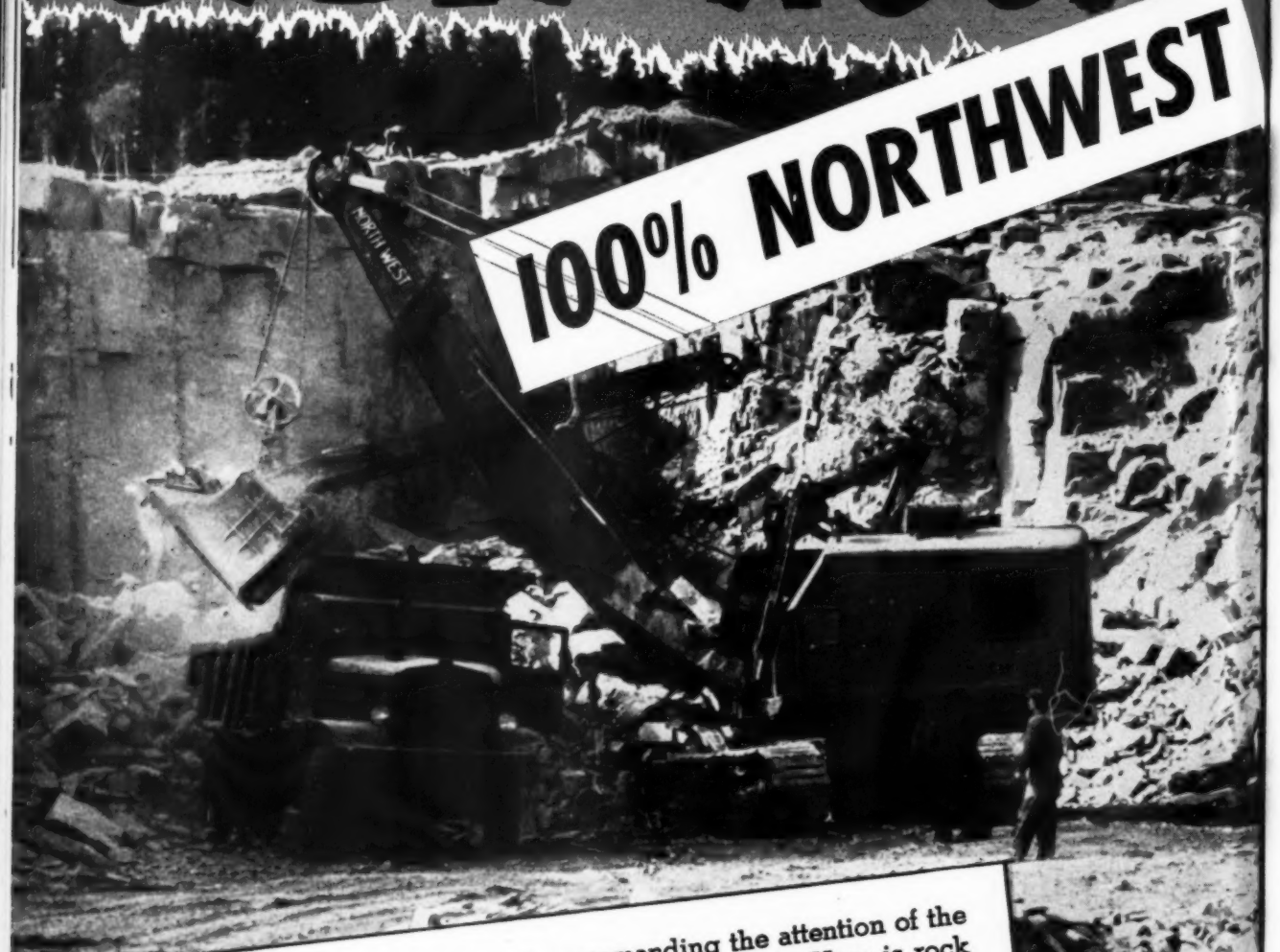
THE BAKER MFG. CO.

504 Stanford Avenue **Springfield, Illinois**

BULLDOZERS SNOW PLOWS **BAKER** CONSTRUCTION EQUIPMENT

STEEP ROCK

100% NORTHWEST



HERE is the rock job that is commanding the attention of the contractors of both the United States and Canada. Here is rock that really is rock! It is significant that when C. A. Pitts moved in on the Steep Rock job he brought only his Northwests, leaving behind other shovel equipment he had used at Shipshaw.

Steep Rock is 100% Northwest as far as shovels and cranes are concerned. Sixteen of them are demonstrating the ability of the Northwest Dual Independent Crowd, the Northwest Cushion Clutch, Northwest Differential Steering, the "feather touch" clutch control, Uniform Pressure Swing Clutches and the many other Northwest features for handling rock jobs fast. If you have a *Real* Rock Shovel you'll have output in *any* kind of digging.

NORTHWEST ENGINEERING COMPANY
1750 Steger Bldg., 28 E. Jackson Blvd., Chicago 4, Illinois

-and when you have a real Rock Shovel you won't have to worry about output in dirt

NORTHWEST

SHOVELS • CRANES • DRAGLINES • PULLSHOVELS

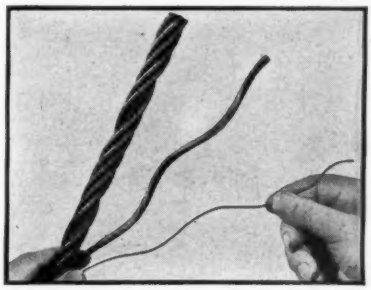
"What can Macwhyte PREformed Wire Rope do for Me?"

Here are specific ways you benefit from the use of Macwhyte PREformed wire rope.

First, you get longer wire rope service for 3 reasons:

1. PREformed has less internal fatigue.
2. PREformed has less internal friction.
3. PREformed has better balance.

Each wire and each strand are PREformed before being laid into the finished rope. The detrimental effects of internal friction and internal fatigue, two of wire rope's greatest destroyers, are reduced to a minimum in Macwhyte PREformed. There is perfect balance. Each strand and wire carries its share of the load.



Second, you get lower cost per load carried.

In Macwhyte PREformed, every strand in the wire rope is under uniform tension. There is no "early wearing out" of some strands while the others "loaf." This perfect balance makes possible lower cost per load carried on the job.

Third, you get fewer shut-downs, less trouble.

Fewer shut-downs are the rule, because PREformed lasts longer. In these times, lost man hours due to repairs or replacements can be disastrous. PREformed helps prevent this.

Less trouble is encountered because PREformed is flexible, easy to handle. The perfect balance of strands means that PREformed is kink-resistant, very easy to take off the reel and put on your equipment.

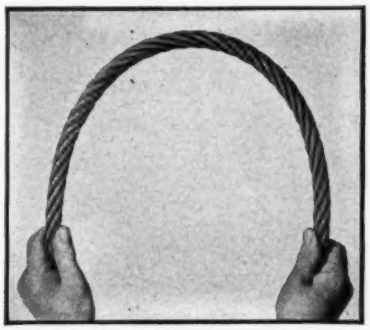


Figure A *Figure B*

Fourth, you have less chance of rope loss or workman injuries.

Macwhyte PREformed is not likely to curl up *(Figure A)* during unreeling and installing. Therefore, the risk of kinking and permanently damaging the rope is greatly diminished.

Nor does PREformed wire rope wicker and become dangerous to handle *(Figure B)*. A wire broken from wear in a PREformed rope lies in place, does not wicker out to injure workmen's hands.

In addition to these 4 specific benefits, add this 5th: Macwhyte Internal Lubrication that goes around every wire in every strand of Macwhyte PREformed wire rope.

Inside bearing surfaces of wires are thus protected against friction and corrosion. All spaces between wires are filled with lubricant to keep out moisture and resist ordinary acids. This tenacious, heavy lubricant Macwhyte uses, clings to wires unaffected by the hottest, coldest, driest, or most humid temperatures.

Macwhyte engineering experience may help you. Tell us your problem. We'll assist you in getting the *correct* rope for your equipment.

MACWHYTE PREformed WIRE ROPE Plus Internal Lubrication Selected Steels Tested-Proved

The correct rope for your equipment

NO. 784

MACWHYTE COMPANY

Wire Rope Manufacturers

ARMY E NAVY

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Save Money with PRIMACORD

One of the big advantages of Primacord shooting is the ease with which you can handle large blasts. As many as 4,000 6-in. holes have been hooked up with 38 miles of detonating fuse and fired as one giant blast.

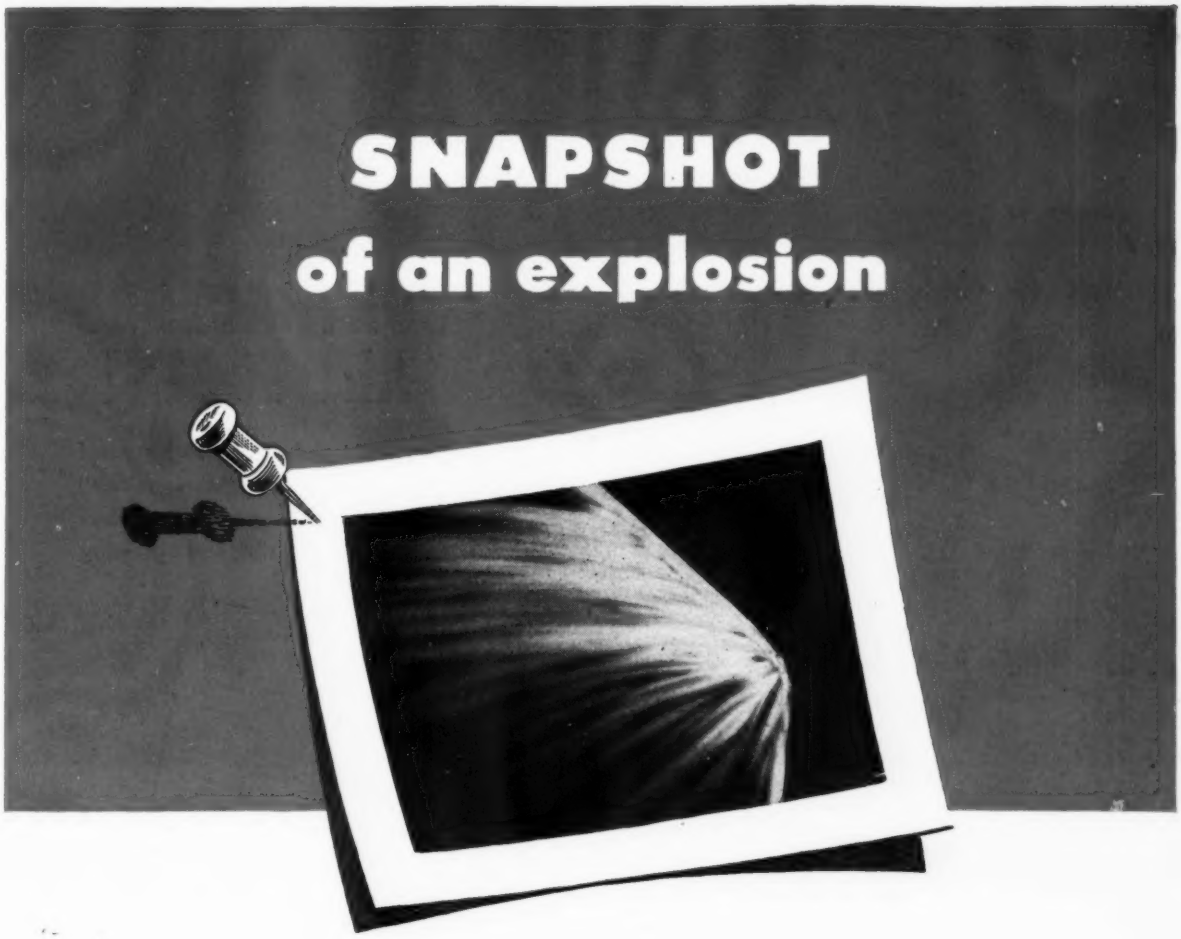
If you wish to increase the number of holes per blast, you can count upon Primacord to go all the way with you. It detonates every cartridge in every hole and connects all holes in a planned sequence that delivers good digging rock. There is really no limit to the number of holes that can be detonated practically simultaneously with Primacord — and larger blasts have been found to offer many economies . . .

PRIMACORD-BICKFORD
Detonating Fuse
Manufacturers of Safety Fuse since 1836

19

THE ENSIGN-BICKFORD COMPANY • SIMSBURY, CONNECTICUT

SNAPSHOT of an explosion



HERE IS A STORY OF AN EXPLOSION—as told by the explosive itself. The narrow, white streak at the right is the path of detonation, flashing through the explosive at about 250 miles a minute! The feathery haze is a photographic record of white-hot gases bursting outward at tremendous pressures as high as a million pounds to the square inch.

Facts such as these are recorded, studied, and analyzed by Hercules scientists. Each day scores of research projects are carried on to broaden the knowledge and understanding of explosives. It is through constant, intelligent research that we endeavor to help you and thus benefit ourselves.

HERCULES EXPLOSIVES

HERCULES POWDER COMPANY
INCORPORATED
972 King Street
Wilmington 99 . . . . . Delaware

"MEASURED AIR" PROVIDES

- MORE POWER—LONGER LIFE
- LESS OPERATING COST
- MORE WORK DONE FASTER

with all these **Thor** **CONTRACTORS' AIR TOOLS!**

Thor "AIR ECONOMY" FIGURED IN YOUR POST-WAR EQUIPMENT PLANS WILL SAVE YOU TIME, CUT COSTS . . . GET TOMORROW'S JOBS STARTED FAST AND MOVING!

The maximum power, balanced stroke and ease of handling provided by exclusive Thor *"measured air"* construction is available in every one of these Thor Contractors' Air Tools to save you time and operating costs on *all* construction jobs.

THOR PAVING BREAKERS

Thor Paving Breakers, light, medium and heavy duty models, are equipped with the same "measured air" type of short-travel tubular valve as Thor Rock Drills.

The Paving Breaker valve actuates a block type piston, powering it with exactly the quantity of air required for both the forward and return strokes . . . minimizes vibration . . . makes the machine easy to handle.

THOR CLAY DIGGERS

Air that powers the stroke of Thor Clay and Trench Diggers is measured by a new short-travel cylinder "rocker" valve which provides *perfect sealing and control* of required pressure for driving the piston.

HOW Thor "MEASURED AIR" ECONOMY WORKS!

Short-travel valve action is the real secret behind Thor "measured air" economy.

The shorter the travel, the more *positive the action* of the valve in admitting to the tool only the required amount of air—in instantly sealing the inlet against excess air.

Short-travel action *reduces wear* on the valve, retains positive "measure" of air for a greatly extended period of service.

Short-travel valve action powers each stroke of the tool with the same quantity of air—providing *smooth, uniform operation.* Elimination of excess air keeps out of the channel the overload of power that staggers the stroke and causes vibration.

For particulars about *automatic rotation . . . cushioned action . . . automatic lubrication . . . exclusive retainer design,* and many other features of Thor Contractors' Air Tools, write today for Catalog No. 42-A.

THOR ROCK DRILLS

A short-travel tubular valve, heat-treated for durability and precision-ground for perfect fit, "measures" air that powers all three types of Thor Rock Drills—Sinkers, Drifters and Stopers.

This precise control of air consumption provides steady power and smoothness in the *automatic rotation* of these drills. *Controlled air* driving the piston gives the steel on the working end maximum forward and rotative action . . . assures fast drilling speed!

Thor *Portable Pneumatic and Electric Tools*

INDEPENDENT PNEUMATIC TOOL COMPANY

EXPORT DIVISION
320 W. 42ND ST., NEW YORK, N.Y., U.S.A.

THOR ROCK DRILLS

Six light, medium and heavy duty models for all rock formations.

THOR DRIFTER ROCK DRILLS

One light, and one medium weight model, hand or power feed, for all hard rock drifting.

THOR STOPER ROCK DRILLS

One medium, and one heavy duty model for stoping under all drilling conditions.

THOR PAVING BREAKERS

Four light, medium and heavy duty models for all demolition work.

THOR CLAY AND TRENCH DIGGERS

One light, medium and heavy duty model of each for all tunnel and wall work.

THOR BACKFILL TAMPERS

One light and one heavy duty model for tamping clay and other stiff materials.

THOR SUMP PUMPS

One current model, designed for all jobs under most unfavorable conditions.

THE CARRYALL YOU'LL NEED *TOMORROW* CAN BE DESIGNED ESPECIALLY FOR YOU *TODAY!*

TODAY special Fruehauf Carryalls are being used to haul giant fighting tanks to the battle fronts and to retrieve them when damaged by enemy fire or mechanical difficulty.

Tomorrow the heavy-duty Trailers that are having their trial-by-fire now will be all the better suited to the requirements of your job. Many of the features of these war-time Fruehaufs have always been incorporated in our units. Many other features are the direct result of war's demands and military experience.

When you work with Fruehauf on your hauling problem, you find this: it is looked upon by our engineers as an *individual* problem. There is no need or inclination to adjust your requirements to our product—because it is just as easy, and far more satisfactory, to fit our product exactly to your requirements.

The Fruehauf you need may range in capacity from 10 to 100 tons . . . it may be either a semi or full-Trailer type . . . single or double-drop-frame . . . side or rear loading . . . may have four tires or up to twenty-four . . . with any one of a number of wheel and axle combinations . . . any width . . . any length . . . the applications to your special needs are endless.

Today, of course, few Fruehauf Carryalls are being built for civilian use. But today is not too soon to consult with our engineers on getting your *postwar* Carryall designed and through the blueprint stage, ready for the production go-ahead. This costs you nothing extra and entails no obligation—but you will find that it saves you weeks in the long run.

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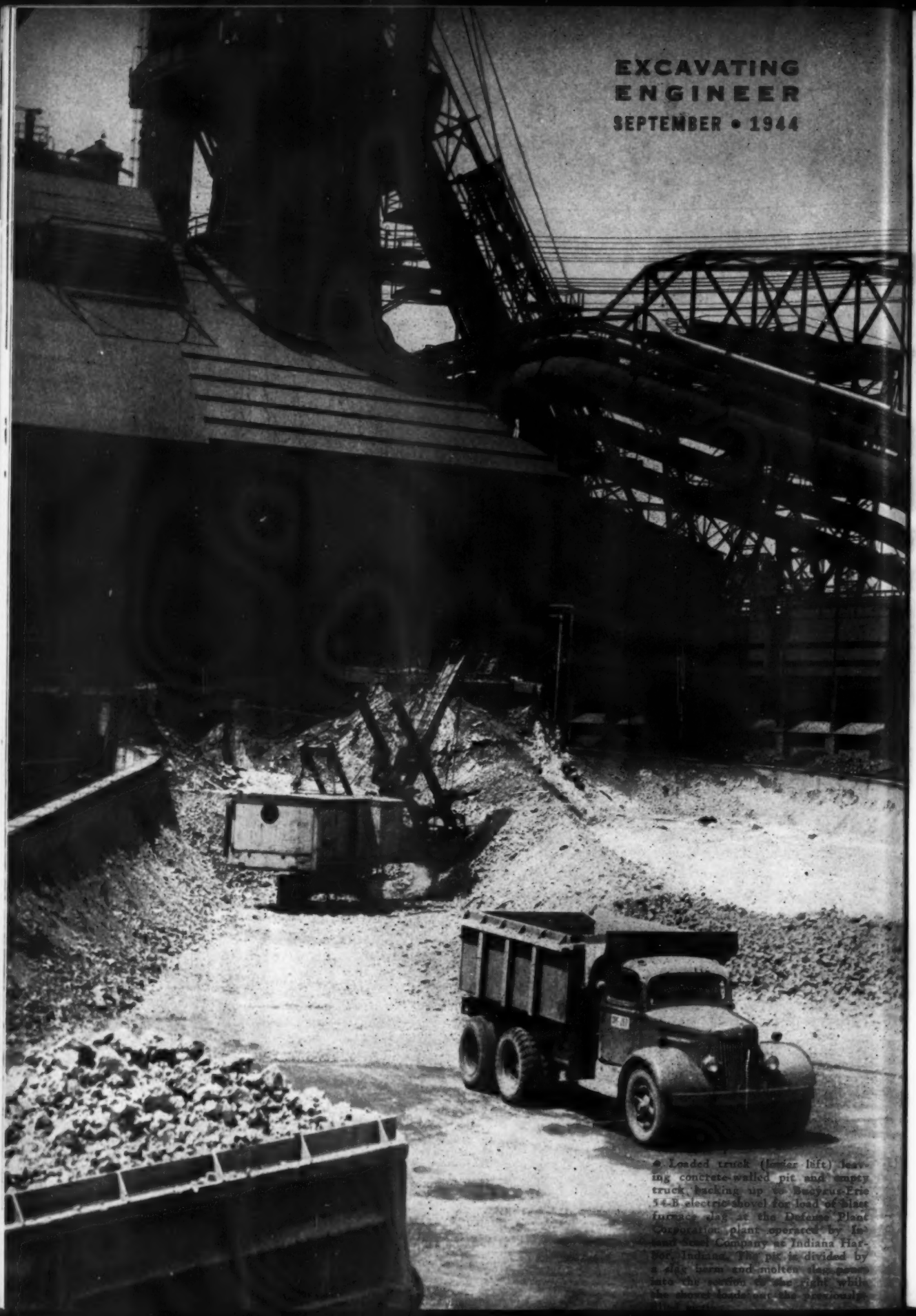
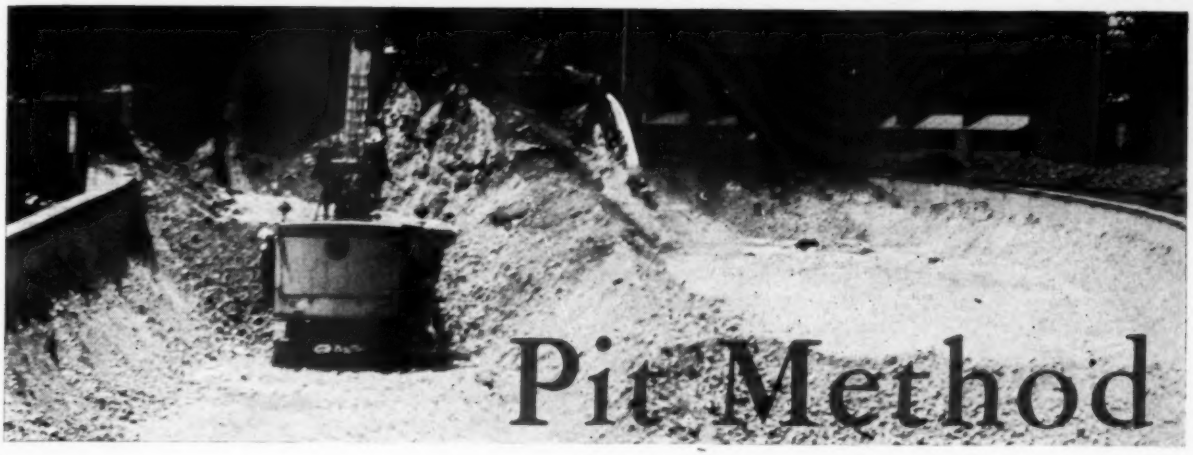
EXCAVATING
ENGINEER
SEPTEMBER • 1944



● Loaded truck (center left) leaving concrete-walled pit and empty truck backing up to Bucyrus-Erie 54-B electric shovel for load of blast furnace slag at the Defense Plant Corporation plant operated by Inland Steel Company as Indiana Harbor, Indiana. The pit is divided by a slag berm and molten slag pours into the section at the right while the shovel loads out the previously



• Molten slag pours into one half of the concrete-walled pit while the electric shovel loads out the other half.

Pit Method of Slag Disposal

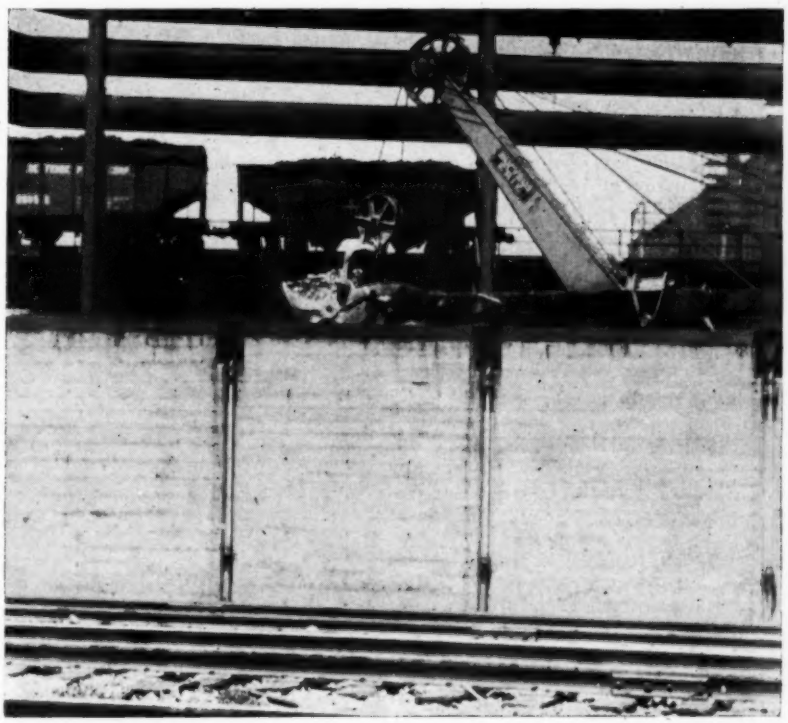
Bucyrus-Erie 54 - B electric shovel handles blast furnace slag disposal from concrete pit at Inland Steel Company's DPC plant which was constructed to step up wartime production.

AS A RESULT of the wartime need for steel, the Inland Steel Company has operated, since November, 1943, a Defense Plant Corporation plant adjacent to its main works at Indiana Harbor, Indiana. The disposal of a monthly average of 17,700 cubic yards of slag from the one blast furnace in operation since the opening of this plant involves separate slag disposal problems because of the impracticability of using the same slag disposal methods and area used by the company for the main plants.*

To care for slag disposal from the DPC plant a concrete-walled pit, 240 feet long and 60 feet wide, ranging in dept from 10 to 15 feet, was constructed next to the blast furnace. A slag revetment divides the pit lengthwise and spouts for molten slag are run from the blast furnace to each half of the pit. The divided halves of the pit are alternately filled and emptied each three days. A Bucyrus-Erie 54-B three-motor Ward Leonard electric shovel working in the pit loads the slag from the pit sections to trucks which haul it to a disposal area about a mile away. While the shovel is working in one half of the pit loading out slag the molten slag is poured into the other half of the pit which is first dammed up at the end opposite the blast furnace.

The concrete pit wall is 18 inches thick at the top and widens out to about 30 inches at the base. A four-inch water supply pipe was laid underground parallel to the concrete walls and 1¼-inch pipes spaced on eight-foot centers, are run vertically through the concrete walls. These vertical pipes are fitted with spray nozzles which are used to spray water on the molten slag to help to cool it. Water used to aid the slag cooling is pumped from Lake Michigan and is

• Outside view of pit wall showing vertical water spray pipes spaced about 8' apart. Spray nozzles are at top of pipes in rectangular openings in wall.



* A description of slag disposal methods employed by Inland Steel Company at its two main plants at Indiana Harbor was printed in the July, 1944, issue of Excavating Engineer.

• Top view of one of the two pit walls. Steel cross plates cover nozzles of water spray system.

part of the regular water supply system of the Inland Steel Company. There is nothing routine about watering the hot slag. Water is used only when it is felt that it is needed to quicken the cooling and it is usually played on the slag at night when the digging is closed down. The time given to spraying is a matter of convenience.

The concrete pit walls are protected from the heat of the molten slag by a bank of slag which is always left as a protection for the walls. The slag revetment which divides the pit lengthwise is also left in position as the shovel loads the halves of the pit alternately. Before the original slag was poured into the pit the walls were banked with a sand fill for protection.

The loading and hauling entrance to the pit is a ramp with a four per cent grade. The same grade is followed the entire length of the pit. The usual weekly procedure followed it to start filling one half of the pit with molten slag about midnight on Sunday. The shovel is put to work digging out the half of the pit that had been previously filled and by Wednesday afternoon this half of the pit is emptied. The shovel is run out of the emptied pit and a wall of slag is built across the pit entrance and at midnight on Wednesday refilling of this pit is started and the shovel is put to work Thursday morning emptying the half that had just been filled. By Saturday afternoon this half of the pit has been emptied and at midnight on Sunday the previous week's procedure is repeated. Thus, both halves of the pit are filled and emptied once a week.

The Bucyrus-Erie electric shovel used for the slag loading operations has a special front end combination which was provided so as to load the slag from the pit to railroad cars spotted on tracks along the outside of both side walls of the pit. To load these railroad cars a higher dumping height than the standard 54-B's range of 14'6" at 40° to 22'9" at 60° was thought to have been necessary and so the standard 28' boom and 18' handle was increased to a 30' boom and 20' handle. To offset the additional reach a 2¼-cu. yd. dipper is used instead of the standard 2½-cu. yd. dipper for this machine.

Although the whole was designed to load the slag from the pit to railroad cars outside of the pit, practically all of the slag is now loaded into trucks running right into the pit behind the shovel. Three 10-ton White side-dump trucks are used for slag hauling.

When the 54-B starts to load out one half of the slag pit it first digs away the slag retaining wall from the end of the pit and then works forward in the pit, digging its way toward the furnace spout which was the source of the slag in the pit. The hauling trucks back in behind the shovel and the shovel loads from ahead and on both sides and swings and dumps to the trucks spotted in the rear. Each of the three trucks hauls an average of 2.9 loads an hour and they keep the shovel busy, allowing for cleanup of the slag on the pit floor. The shovel takes care of the entire digging operation alone and does not have auxiliary equipment, such as a bulldozer, to aid in the cleanup operations.

The shovel and trucks work one eight-hour turn (shift) a day for six days a week. The usual working hours are from 7 a.m. to 3 p.m., but working hours are changed to meet conditions. In extremely hot summer weather it is often the practice to start earlier and get in more of the eight-hour shift during the cooler period of the day.

Electric, rather than diesel power was selected for this slag disposal shovel because of the confined area in which the machine was to operate and the readily available source of electricity. The power plant at the Indiana Harbor works of Inland Steel Company furnishes the power for the shovel operation. The power is fed to the machine at 25 cycles, 2200 volts. The cable to the shovel is run from the supply source around the rear of the pits and into the pit being excavated.

All maintenance work is done at the shops at Inland Steel where the numerous other shovels, cranes, tractors, bulldozers, locomotives and other equipment are also maintained. Electrical maintenance is taken care of by the company's electrical maintenance crews. There have been no major repair jobs done on the 54-B since it was put into operation at Inland Steel Company. Minor repairs are taken care of during off shifts. The slag pit is limited in capacity to 16 hours of operation over the hours now worked by the shovel and trucks and if this safety period is exceeded it would mean that the furnace would have to be pulled for there would be no means of further slag disposal.

The chief problem confronting company officials in this slag disposal operation is the wear and tear on the hauling trucks, tires. The tires wear out unusually fast due to the abrasive nature of the slag the trucks are forced to run on when loading and also in dumping.

• Concrete pit walls are protected by a bank of slag. Slag berm to right divides pit into two sections which are alternately filled and loaded out about each three days.

Ground Bearing Area
for Excavating Equipment

Common basis of measurement must be definitely determined for a fair comparison of supporting areas of excavating equipment but the ground areas alone are insufficient to predict performance.

By T. Davidson
(Development Engineer, Bucyrus-Erie Company)

EXCAVATING MACHINERY and much other construction equipment generally must move across and work upon unprepared or newly excavated ground which may be anything from a hard rock quarry floor to a soft marsh. Obviously, the ground supporting area provided, either as caterpillar tracks or pneumatic tires, must be proportioned to meet conditions that are ordinarily encountered by each specific unit. Unfortunately, there are no known factors from which a design, satisfactory for any set of specified conditions, can be calculated with mathematical certainty, so that the selection of a proper supporting area is very largely a question of judgment and experience. That wide variations are permissible is shown by the 50 pounds per square inch ground pressure for the big 33-cu. yd. stripping shovels operating on a coal seam; the 20 to 25 pounds per square ground pressure for the 3-cu. yd. to 6-cu. yd. machines used in quarrying and mining which generally operate on hard floors but may encounter soft pockets or be used in stripping; and the six to eight pounds per square inch for some small draglines with special mountings built for particularly severe conditions.

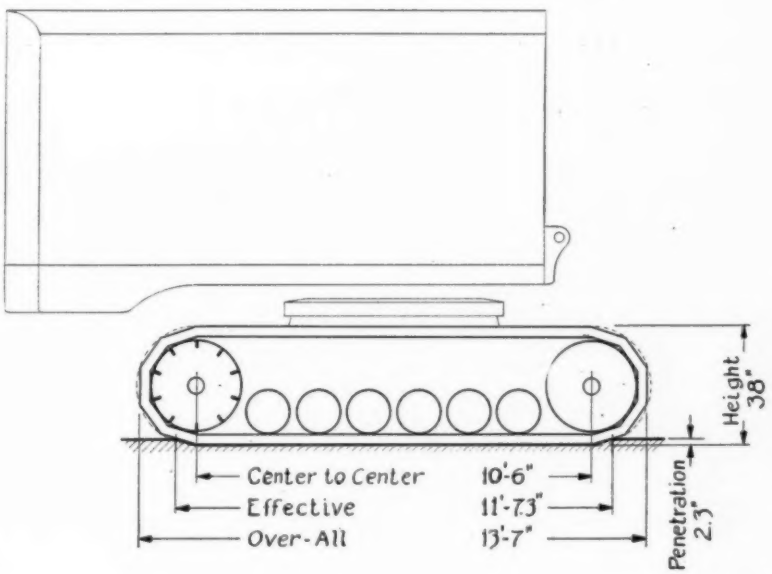
It is not the intention of this article to argue the proper dimensions for the supporting area on any machine. The purpose is to show the importance of a uniform basis for measuring such areas so that the user's judgment and experience may be applied intelligently to the consideration of specifications covering new equipment. Since any piece of construction equipment may at some time encounter softer ground conditions than those anticipated at the time of its purchase, large supporting areas are desirable, but on the other hand units developing large areas, be they tires or caterpillar tracks, are more liable to damage in service and are more costly to replace, so that large areas may not be entirely advantageous.

The need of a uniform basis for measuring the supporting area of caterpillar tracks may be shown by consideration of a popular 1½-cu. yd. shovel whose caterpillar track dimensions are shown in Figure 1; this particular machine is furnished with either 24-inch or 30-inch track links. If one manufacturer should use the overall length of 13'—7" to figure the supporting area he would show 54.3 sq. ft. with 24-inch links, whereas another manufacturer using the length of 10'—6" center to center of tumblers would show only 52.5 sq. ft. with 30" links, or 3½% less nominal area for a track which actually is 25% larger.

Commercial Standard

In 1941 the National Bureau of Standards issued Commercial Standard CS90E-41 entitled, **"Crawler Mounted, Revolving Power Shovels, Lifting Cranes, Dragline and Clam-**

Figure 1



shell Excavators (Export Classifications). Paragraph 6 is quoted complete from this standard:

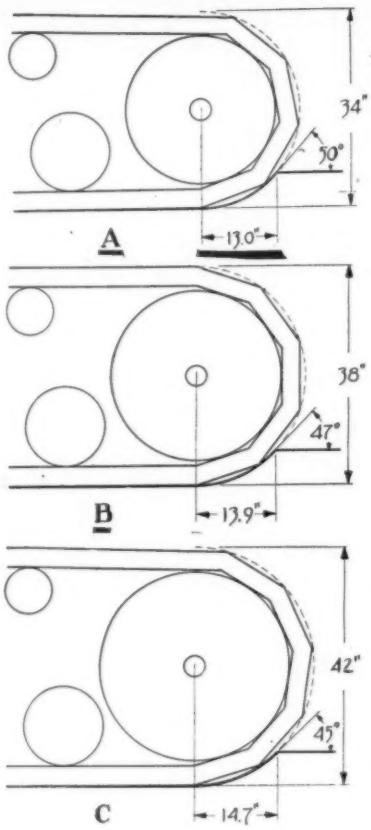
"6. Crawler bearing length—The length of the crawler bearing on the ground is computed as not more than the normal distance from center to center of the crawler end sprocket or tumbler wheels, plus 35 per cent of the overall crawler height at center of end sprocket or tumbler wheels. (This takes into account the bearing of about one additional pitch of the crawler shoes.)"

On the basis of this standard the "effective length" of the caterpillar track in Figure 1 is 11'—7½"; its nominal supporting areas are 46.5 sq. ft. with 24" track links, and 58.1 sq. ft. with 30-inch track links. Only 2.3 inches penetration below the ground surface is required to develop the "35% of height" additional length, when divided equally between the two ends.

Crawler Proportions

Track type tractor manufacturers use the length center to center of end tumblers to determine the supporting area. That is, they specify the actual contact area when the tractor is standing on hard ground. The greater variations between competing designs is the reason such machines as shovels and dragline are not similarly specified. Figure 2 shows the ends of three caterpillar units, in which B is the same as the unit shown in Figure 1, A has a tumbler four inches smaller in over-all diameter, and C has a tumbler four inches larger. Assuming all three units have the same length center to center of tumblers, and using the "35% of height" rule, the specified length, and consequently area, of A would be 1% less than that of B, and the area of C would be 1% greater than that of B. These figures penalize the unit with the small tumbler and give credit to the large tumbler, but in actual performance the differences often will be much greater than these small percentages indicate. (Figure 2 shows the units sunk six inches below the ground surface. Comparing units A and C it is seen that the latter has 1.7 inches more actual contact length on each end, or 3.4 inches more for the two ends (the "35% of height" rule gives C credit for 2.8 inches greater length than A.) The slope of the track where it meets the ground surface is 50° for A and 45° for C; therefore C will have a greater ability to climb out of a hole, but C will also have a greater tendency to push dirt ahead of itself and sink in deeper. The greater height of a unit such as C allows the axles carrying the caterpillar frames to be placed higher above the ground than is possible with a unit such as A; this is of great importance in soft ground, as a caterpillar will continue to move at almost any penetration unless some part of the main structure, such as an axle, contacts the ground increasing the resistance to motion and at the same time relieving some of the weight from the caterpillar tracks and so reducing their traction.

Figure 2



The importance of this climbing ability in soft ground has been amply demonstrated by the so-called "tapered end" caterpillars which have been used on draglines for drainage work, and the like. Figure 3 shows the outline of such a caterpillar for a 2½-cu. yd. dragline developed shortly before the war. Although the actual flat length between end rollers, in contact on hard ground, is only 13% greater than the length between tumblers of the conventional unit for this machine, this tapered end caterpillar has shown marked advantages for heavily counter-weighted machines in all kinds of service. This type of caterpillar, of course, is unsuitable for shovels because its length would interfere with the dipper action. The proper method of specifying the area of this type of caterpillar is an open question. The 14'—5" effective length shown in Figure 3 was determined by adding 35% of the height to the length center to center of rollers. The manufacturer of this particular unit has used an arbitrarily determined length of 15'—9" to determine the specified area. It is the writer's opinion that on the basis of performance comparable to conventional types, it would be fair to use an effective length equal at least to the length

Figure 3

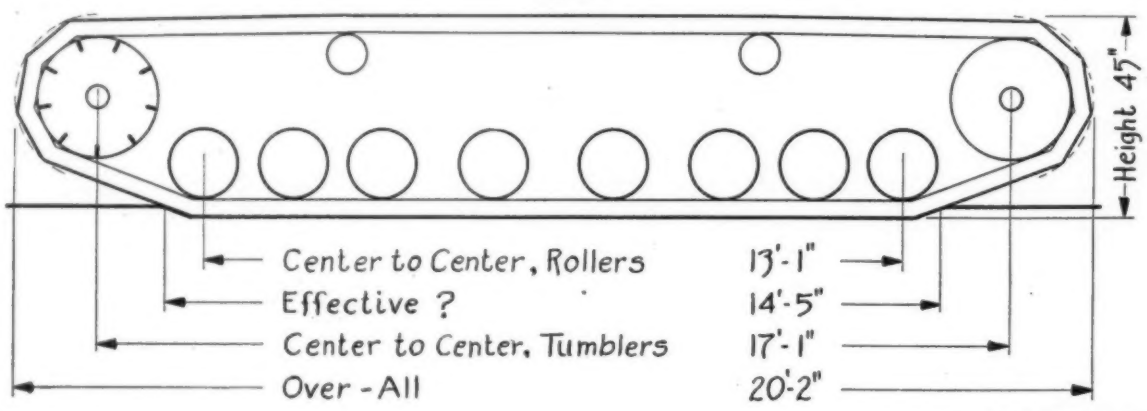
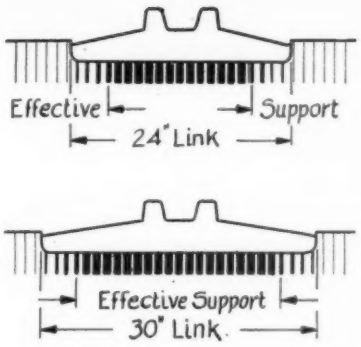


Figure 4



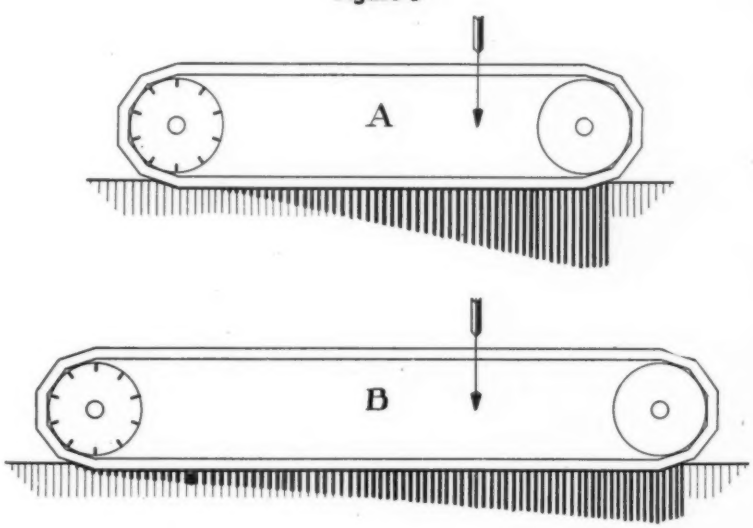
center to center of tumblers, provided the tapering is not carried to extremes.

Total ground supporting area, regardless of how it is determined, is not the whole story of a machine's ability to perform on bad ground. As has been previously indicated, the shape of the caterpillar ends may play an important part. Furthermore, equal areas may be attained with short, wide tracks, or with long, narrow tracks. Figure 4 shows a comparison of the supporting abilities of a narrow link and a wide link. In certain kinds of going—dry sand or loose mud, perhaps—the freedom of material to flow out from under the ends of the links will cause a tapering off of the ground's supporting ability. This loss will be about constant regardless of the width of the links; if equal amounts are deducted from narrow and wide links, the percentage loss will be greater for the narrow link than for the wide one.

On the other hand long, narrow tracks may under certain conditions show superior performance to short wide ones. Figure 5A shows a standard, or shovel, caterpillar track and Figure 5B shows a special, long caterpillar mounting for the same machine when used with dragline or crane equipments. In this case caterpillar B has 135% of the effective area of A, and if both are equipped with the same links and are centrally loaded, A will have 133% of the ground pressure required to support B. But if the load is off center, as indicated by the arrows, a condition often existing in excavator operation, the pressure supporting the two units will be distributed as shown by the heavy lines, and A will have 157% of the ground pressure required to support B. Or if the link widths are adjusted to give the same total areas for both caterpillars. A will have 116% of the ground pressure required to support B. If the load is moved still further off-center, the advantage of B will be proportionately greater.

• Wide variations are permissible in the selection of a proper supporting area. The Bucyrus-Erie 1050-B 33-cu. yd. stripping shovel operating on a coal seam at the Flamingo Mine of the Fairview Collieries in Illinois shown above has a 50 lbs. per square inch ground pressure. Quarry shovels from 3 to 6 cu. yds., generally operating on hard floors, have from 20 to 25 lbs. per square inch ground pressure, and some small draglines with mountings have a ground pressure of from six to eight lbs. per square inch.

Figure 5

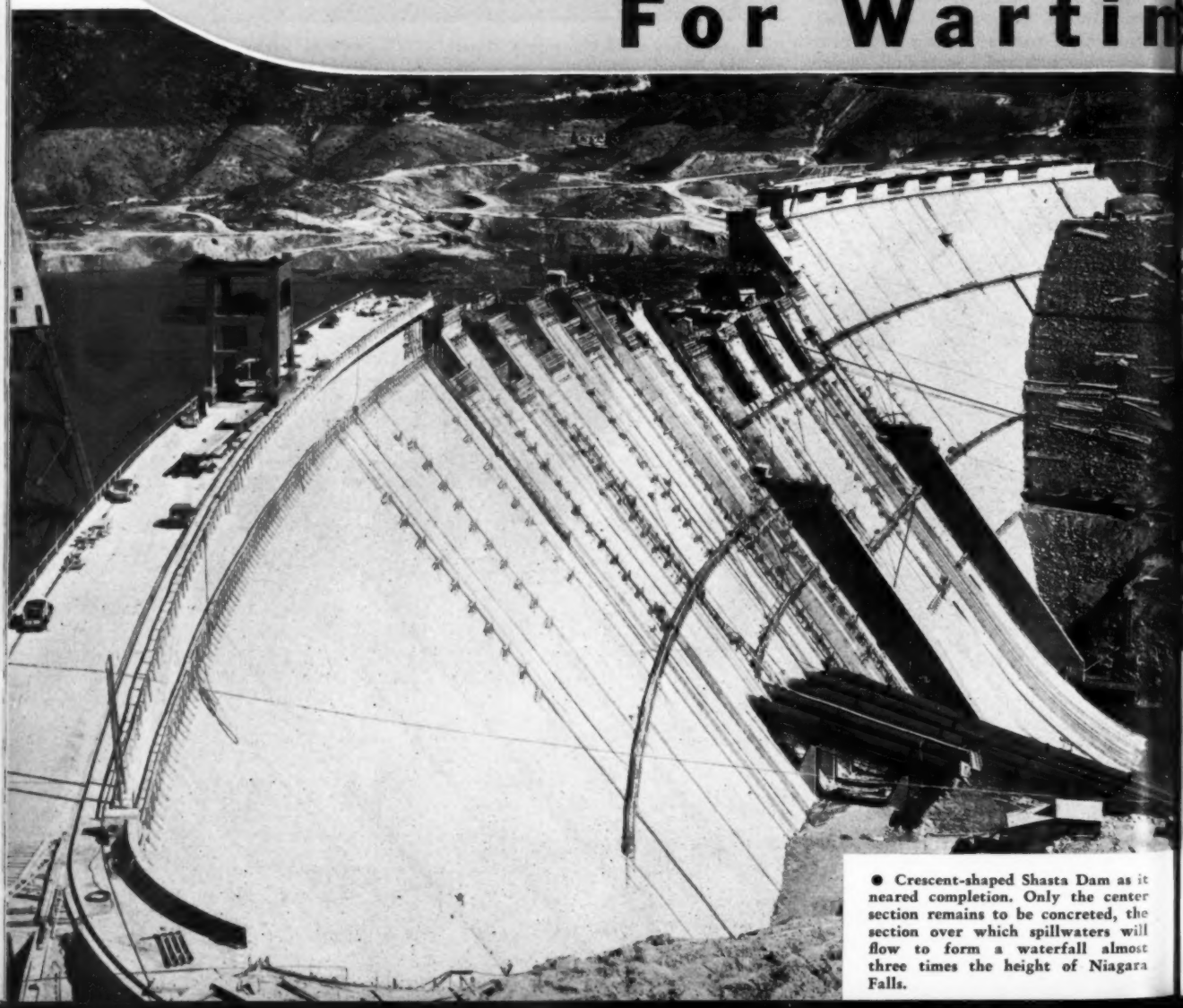


It is apparent, therefore, that comparison of specified supporting areas are meaningless unless such areas definitely are determined on the same basis it is evident also that comparison of areas only is insufficient to predict performance, and that other factors must be considered in the light of the user's experience in conditions similar to those likely to be encountered.

This is the first of a series of articles by T. Davidson on standardization of excavating equipment specifications. The subject of the second article, to be published in the October issue of Excavating Engineer, will be, "Backward Stability of Crawler Mounted Machines."

MORE POWER

For Wartim



● Crescent-shaped Shasta Dam as it neared completion. Only the center section remains to be concreted, the section over which spillwaters will flow to form a waterfall almost three times the height of Niagara Falls.

● Left: Operations in the river channel as seen from foot bridge down-stream. Bucyrus-Erie 20-B crane in center is handling a skip bucket while wagon drills in lower left prepare channel area for blasting. Below: Byers shovel loads trucks with rock for surfacing haul road to barge landing in the Shasta reservoir.

● Left: Bucyrus-Erie 5-cu. yd. electric shovel owned by Pacific Constructors, Inc., builders of Shasta Dam, loads rock for the abutments of the dam. Caterpillar tractor with LeTourneau bulldozers cleans up around the shovel.

Industries

All photographs used through courtesy of the Bureau of Reclamation.

● Above: General view of operations progress in June, 1942. Right: Bucyrus-Erie 46-B dragline excavating in spillway apron area.

Power production starts at Shasta Dam four years after the first concrete was poured on July 8, 1940. Structure built by Pacific Constructors at an estimated cost of $87,167,000 has a structural height of 602 feet and crest length of 3,500 feet.

SHASTA DAM, THE SECOND most massive structure ever built by man, has been at work serving several of the multiple purposes for which it was designed, but one of its principal war-time functions started about the middle of July with the commencement of electric power production. Two generators of 150,000 kilowatts capacity were officially placed in operation in the huge 375,000 kilowatt power plant at the dam last month. Power is being delivered to the newly-constructed section of the government transmission line from the dam to Oroville.

Power from Shasta and other dams is making possible the almost super-human task of building thousands of warships, warplanes, tanks, and guns of all kinds. The processing of newly opened deposits of magnesium, the aluminum reduction plants, and other industries are producing millions of tons of vital war needs.

Shasta Dam, on the Sacramento River in Central Valley in Northern California, was built at an estimated cost of $87,167,000. Pacific Constructors were builders of the dam and power plant. The first concrete was poured in Shasta Dam on July 8, 1940, and since then work has gone on night and day. The structural height of Shasta, a concrete, straight-gravity type dam with slightly curved abutments, is 602 feet. The crest length is 3,500 feet and its volume is 6,230,000 cu. yds.

In addition to the two new 75,000 kilowatt generators put into use, there is space for three more

● Right: Wagon-mounted drills working in river section. Below: Sand scavenger that was used to remove sand from the plant wash water at the Redding gravel pit.

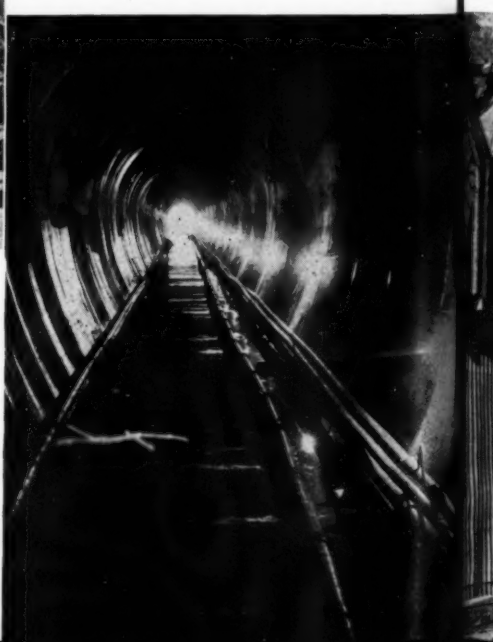
units of the same size. two of which were manufactured in 1943 and loaned to Grand Coulee power plant where they are now in war service in the Pacific Northwest. The fifth, and final unit was partially completed when the War Production Board halted its construction in 1942. Complete installation of all generators will be made after the war.

Water storage began in Shasta Lake on December 30, 1943, when the diversion tunnel gates were partially closed. The west tunnel under the dam was first used by the Southern Pacific Railroad prior to its relocation outside of the reservoir area and later was used to divert the flow of the river while concrete was poured in the spillway section of the dam. The tunnel is now plugged with nearly a thousand feet of concrete, and releases from Shasta Lake are made through power penstocks or through outlet tubes installed in the spillway section of the dam. In normal operation these outlets will release water from the lake for downstream use when the lake level is below the height at which it spills or when the power plant is not in operation.

To relocate the railroad, which otherwise would have been submerged by the rising lake, 30 miles of new railroad, including 12 tunnels and eight bridges, were built. About 12

● Below: Tunnel alongside Shasta Dam used by the Southern Pacific railroad from June, 1939, to June, 1943, when the right and left abutments of the dam were being constructed and the river flowed through the center of its ancient bed. When construction was started on the center of the dam the railroad used its relocated line and river by-passed the dam by flowing through the tunnel.

● Above: General view of the left abutment excavation taken from top of right abutment. Left: Telephoto view of Caterpillar tractors with LeTourneau bulldozers in operation at the Carrico and Guthier Co. iron mine preparing the area for the Shasta reservoir.



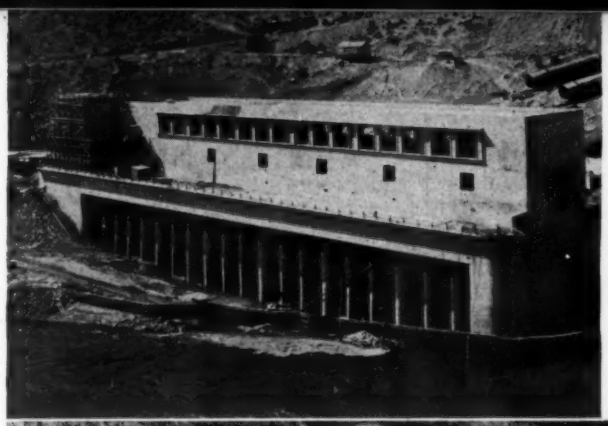
miles of U. S. Highway 99 were constructed also to avoid the lake (Excavating Engineer, April, 1943). The Pit River bridge, one of the highest double-deck bridges in the world, carries both the railroad and the highway across the Pit River arm of the reservoir.

During the past six months, Shasta Lake has attained a length of nearly 30 miles, with water at the upstream face of the dam about 325 feet deep. This reservoir, when full, will cover 29,600 acres, and will store 4,500,000 acre-feet of water.

When the top jagged center portion is squared off with concrete, Shasta Dam's crescent-shaped, 602-ft. tall bulk will be ready for the first spill, perhaps next summer, when a waterfall 350 ft. wide may plunge down 480 feet, almost three times the height of Niagara Falls.

Surplus flood waters stored behind Shasta Dam will be released and transferred by a series of canals and pumping plants to the San Joaquin basin in the southern end of the valley. Nearly two million acres of thirsty lands to the south will be assured irrigation supplies by the transfer of flood waters from Shasta Dam.

A 10½-mile conveyor belt, longest ever built, carried sand and gravel at a maximum rate of 1100 tons per hour from a pit near Redding, uphill and down, to stock piles at Coram, nearly a mile downstream from the dam. Another conveyor belt moved the aggregate to the concrete mixing plant at the dam.



● **Left: General view taken a year ago of the power plant then under construction. Bucyrus-Erie 46-B dragline in center foreground is cleaning up. Below: River diversion operation looking upstream. River diversion channel is in center foreground.**

● **Below: First load of grout being poured into the hopper of the "pumpcrete" gun to be forced through the 1200-foot tubes to the tunnel plug at Shasta Dam.**

● **Above: Left abutment of the dam as seen from the upstream side of the right abutment. At the time this picture was taken more than 62,000 cubic yards of concrete were in place. Right: Northwest shovel loading trucks in preparing iron mine of Carrico & Guthier Co. for reservoir area.**

Shots from the FIRING LINE

Remove Restrictions on 26 Types of Equipment

The War Production Board removed restrictions on the sale of 26 types of construction equipment and made other changes to decrease paper work in the administration of Order L-192, which controls the manufacture and distribution of construction machinery and equipment and repair parts.

This action reflects an easing in the supply situation for certain items, WPB officials said. No increase in the total volume of production is anticipated.

The 26 types of equipment are transferred from Schedule A of the order to Schedule B. Items listed in Schedule A may be sold to war agencies without restriction and to other purchasers only upon specific WPB authorization.

One item, carrying and hauling scrapers with more than 15 cubic feet capacity, has been removed from Schedule D, which lists items that may not be manufactured. These scrapers are now included in Schedule A. The change has been made to take care of a growing demand for large scrapers in mining operations, WPB said.

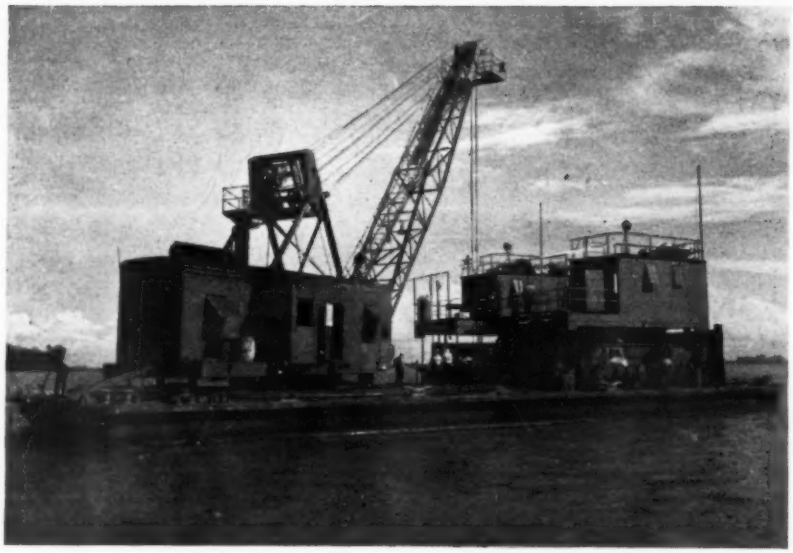
Items listed in Schedule B may be sold only on orders rated AA-5 or better. This provision became effective August 3. Formerly, L-192 imposed no rating restrictions on these items. Production schedules for B items, formerly required once a month, are now filed on a quarterly basis. The schedules will show the rating pattern of the producer's deliveries for the previous quarter, and his planned production in total units for future quarters. The information will enable the Construction Machinery Division to coordinate authorized production with the quarterly allotments of controlled materials, tires and lumber.

Provisions governing the manufacture and sale of repair parts for items in Schedule A remain substantially unchanged, except that export purchase orders for repair parts amounting to less than $100 are now exempt from the necessity of obtaining specific WPB authorization. The exemption formerly covered only orders amounting to less than $50. Though the dollar volume of export orders under $100 is not very great, the number of such sales is large, WPB officials said.

All restrictions on the distribution of repair parts for B items have been removed since the supply of these parts is reported adequate.

The order specifically states that production of both Schedule A and Schedule B items will be authorized so that labor requirements in any plant will not interfere with war production in that plant or in any other plant in the same area. In approving a producer's total production of equipment for non-military use, WPB may consider the producer's total production of a particular type of equipment during the years 1937-1941. Other factors, including the availability of materials and components, also will be considered.

Construction equipment controlled by the order is at present produced by approximately 300 manufacturers, WPB said. In 1937, the peak year for pre-war production, sales of all items covered by L-192 amounted to approximately $247,000,000. Sales in 1943 totaled about $721,000,000. It is expected that the 1944 rate of production



• It's got sea-legs now. This Bucyrus-Monighan 5-W, with its famed walkers removed, is mounted on a sea-going barge. When this picture was taken by Warrant Officer S. P. Wilson (CEC) USNR, the Monighan was being used as a crane in the erection of the barge superstructure and placing of equipment and power machinery for the barge. Later, the Monighan will be equipped with a clamshell bucket or dragline and be used by the Seabees for dredging around the newly captured Marshall Islands.

• Tractor cranes are used to stack bombs in neat piles at a U. S. Army 20th Bomber Command base in India in preparation for B-29 Super-fortress raids on Japan. The big bombers have the greatest load capacity of any ship of the skies.

U. S. Signal Corps Photo

• After removing the fuse from an unexploded German magnetic mine, a Caterpillar diesel tractor and LaPlant-Choate 'dozer are used by a group of U. S. Army Engineers to haul away the bomb found under the ruins of the Cherbourg docks in France.
U. S. Signal Corps Photo

will be about the same as that for 1943, WPB said.

Approximately 73 per cent by dollar value of total current production is used for the military services; five per cent is used for export, and 22 per cent for essential civilian requirements.

The 26 types of equipment that have been transferred from Schedule A to Schedule B are: Angledozers and modifications (for mounting on tractors of 25 drawbar H.P. or less); contractors' rotary brooms; concrete buggies and carts (hand operated and power propelled); bulldozers and modifications (for mounting on tractors of 25 drawbar H.P. or less); concrete handling chutes; concrete surfacing machines, highway type; construction material conveyors, portable belt type and for portable plants; contractors' and material handling derricks, guy and stiff leg stationary type; road discs, wheel mounted and harrow type for construction work; blade ditchers; rock drilling machines and modifications, hand held or portable mounted (except electric coal and core drills); self-propelled finegraders and subgraders; finishers and rodding machines for wet concrete; concrete road forms; graders, under truck type; grapples, rock type; pile hammers; portable concrete hoppers; aggregate pulverizer mixers; cable-laying plows; snow plows (for mounting on tractors of 25 H.P. or less); road rippers; rollers, tamping and sheepsfoot; scarifier, complete machines, not attachments; concrete placing and material elevating towers, and logging wagons (wheel type).

Set Retail Ceilings on Off-the-Road Tires

Retail ceiling prices for off-the-road tires made with rayon fabric, which are used principally on road construction equipment, were established by the Office of Price Administration for the temporary period August 10, 1944, to October 15, 1944.

Ceilings will be 112½ per cent of the already established maximum price for the same type, size and ply new tire made of cotton fabric.

The differential for rayon provided in today's action is limited to the period ending October 15, 1944, pending reconsideration of the entire problem of rayon differentials. Further study will be given by OPA meanwhile with a view to determining what differential, if any, should be permanently established.

National Crushed Stone Safety Competition Awards

Eleven out of 34 plants that participated in an accident-prevention contest among quarry and crushed-stone operations during 1943 were operated during the contest year without a lost-time or disabling injury among the workers, according to an examination of reports furnished by operating companies to the Bureau of Mines, United States Department of the Interior. The contest of 1943 was the 18th yearly competition conducted by the Bureau of Mines, in cooperation with the National Crushed Stone Association, for the promotion of safety among workers in the crushed-stone industry. In addition to the 34 plants, all of which were open quarries, five underground quarries or mines were enrolled in the contest; none of these, however, were free of accidents during the year. The 39 open quarries and underground mines were operated in 15 states.

In accordance with the rules under which the safety contest is conducted,

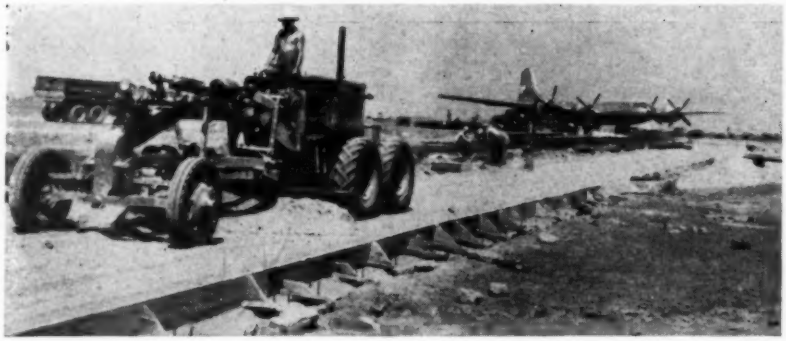
So that's one of those bigger pay loads the crane man swears by!
HAISS Hi-Power Digging Buckets in one recent, competitive test showed 40% better efficiency than the next best—due largely to superior design of its closing gear. It pays to say "Haiss"
HAISS
DIGGING BUCKETS
GEORGE HAISS MANUFACTURING CO. INC., 144th St. & Park Ave., New York 51, N. Y.
Bucket agencies throughout the country Write, wire for prices, delivery or catalogs.

a trophy, provided by the Explosives Engineer magazine, is awarded to the plant that establishes the best safety record.

The winner of the safety trophy for 1943 was the Bessemer limestone quarry, operated by The Bessemer Limestone & Cement Company, at Bessemer, Lawrence County, Pa. This quarry was operated for 368,483 man-hours during 1943 without a disabling injury to an employee.

Nine plants were awarded honorable mention for operating throughout the year without a lost-time or disabling injury to an employee. These plants are as follows:

LeRoy limestone quarry, LeRoy, Genesee County, N. Y., operated by General Crushed Stone Co., worked 99,-104 man-hours;



• Galion motor grader at work on a taxi strip constructed for the B-29 Super-fortresses at a U. S. Army 20th Bomber Command base somewhere in India. Thousands of cubic yards of concrete were used in building strips thick enough and strong enough to support the weight of the gigantic bombers which are already dumping their loads on the Japanese homeland.

Rock Hill trap-rock quarry, Quakertown, Bucks County, Pa., operated by General Crushed Stone Co., worked 89,374 man-hours;

Oglesby limestone quarry, Oglesby, La Salle County, Ill., operated by Marquette Cement Manufacturing Co., worked 81,343 man-hours;

Marquette limestone quarry, Cape Girardeau, Cape Girardeau County, Mo., operated by Marquette Cement Mfg. Co., worked 68,197 man-hours;

White Haven sandstone quarry, White Haven, Luzerne County, Pa., operated by General Crushed Stone Co., worked 53,132 man-hours;

Catskill limestone quarry, Catskill, Greene County, N. Y., operated by North American Cement Corporation, worked 48,966 man-hours;

Plainville No. 4 trap-rock quarry, Plainville, Hartford County, Conn., operated by New Haven Trap Rock Co., worked 37,736 man-hours;

Jordanville limestone quarry, Jordanville, Herkimer County, N. Y., operated by General Crushed Stone Co., worked 37,019 man-hours;

Granby No. 5 trap-rock quarry, Granby, Hartford County, Conn., operated by new Haven Trap Rock Co., worked 10,248 man-hours.

The 39 plants—34 open quarries and five underground mines—that participated in the 1943 contest worked 5,-770,085 man-hours, an average of 147,-951 man-hours per plant. Accidents to the employees caused deaths and non-fatal injuries, all of which represented a combined charge of 41,081 days of employee-disability. The accident-frequency rate for the 39 plants was 33.10 per million man-hours; the accident-severity rate was 7.12 per thousand man-hours.

Winners Named in National Sand and Gravel Contest

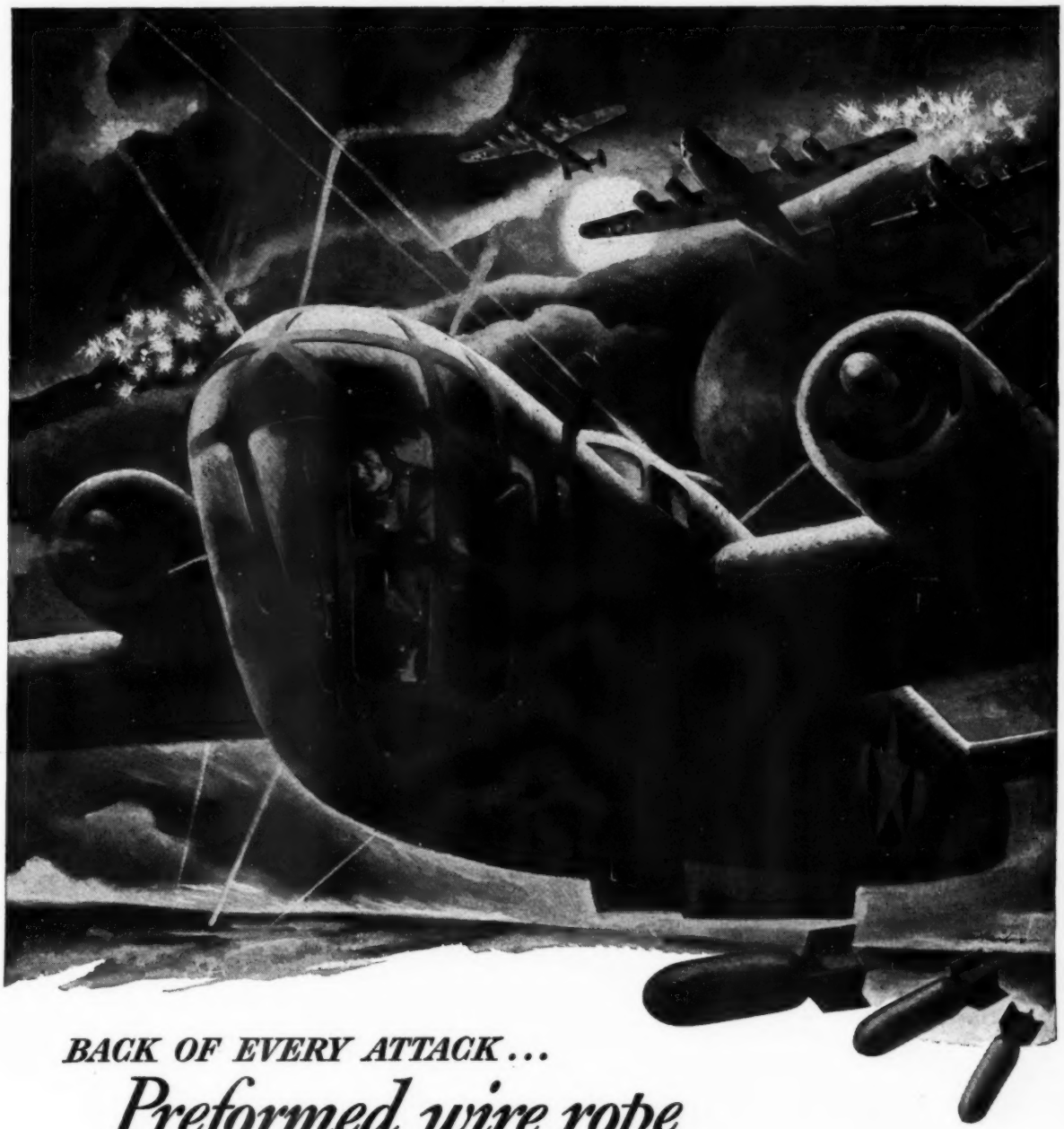
The Dravo Corporations' Pittsburgh River plant at Pittsburgh, Pa., and the Dixie Sand and Gravel Corporation's

War-created scarcities *make Tires and Time priceless* because Trucks, Tractors, Trailers, and all sorts of heavy equipment must be kept going.

In such conditions the Extra Qualities of GATKE Brake Blocks stand out like a lighthouse in a storm. They give smooth, non-grabbing action that saves tires and equipment—Tremendous Stopping Power for Safety and Dependability — Long wear life for extra mileage between adjustments.

Try GATKE Brake Blocks for your next 5 relines. Compare results with the best you ever had. Ask your GATKE Jobber or write for particulars.

Gatke CUSTOM-BILT BRAKE LININGS
BLOCKS SETS ROLLS SHEETS
GATKE CORPORATION
228 N. La Salle St., Chicago 1, Ill.



BACK OF EVERY ATTACK...

Preformed wire rope

GIVES BOMBER PILOTS SPLIT-SECOND CONTROL

A pilot flies his bomber through black bursts of flak toward an enemy target. Suddenly the bombardier's voice comes through the intercom, *"On target!"* Then, *"Bombs away!"*

From take-off to target, the bomber's engines, rudders, bomb releases are controlled to split seconds by Preformed wire rope. Thousands of feet of it go into the rigging of a bomber.

Every foot of it on all our fighting planes is Preformed—because only this superior wire rope gives the long life, the never-failing action airplane controls must have.

Preformed is proving in the sky—as it has proved on sea and land—that it is the tough wire rope for the tough war jobs. Back of every attack, Preformed is in there fighting.

ASK YOUR OWN WIRE ROPE MANUFACTURER OR SUPPLIER FOR PREFORMED WIRE ROPE

Chattanooga plant at Chattanooga, Tenn., were named winners of the 15th annual safety contest conducted by the Federal Bureau of Mines and the National Sand and Gravel Association.

The Pittsburgh River plant, operating 223,938 man-hours without a disabling injury, led the group which worked 100,000 or more man-hours, while the Chattanooga plant, with 64,376 man-hours, had the best record among the many plants operating less than 100,000 man-hours without a disabling injury. The 64 competing plants operated a total of 4,028,327 man-hours with an accident-frequency rate of 33.51 and an accident-severity rate of 10.74. In all, 18 plants operated throughout 1943 without a disabling injury.

Awarding of certificates has been suspended for the duration of the war, but the following plants fulfilled the requirements for certificates by posting perfect safety records for 1943:

Chelsea lake plant, Memphis, Shelby County, Tenn., operated by the Missouri Portland Cement Co., 145,962 man-hours.

Price river plant, Price, Tulsa County, Okla., operated by Chandler Materials Co., 30,063 man-hours.

Hawarden wet-pit plant, Hawarden, Sioux County, Ia., operated by L. G. Everist, Inc., 27,303 man-hours.

Thomas dry-bank plant, Thomas, Tucker County, W. Va., operated by Fairfax Sand and Crushed Stone Co., 25,086 man-hours.

Delavan dry-bank plant, Delavan, Walworth County, Wis., operated by J. F. Thorpe Co., 23,753 man-hours.

Muskegon dry-bank plant, Muskegon, Muskegon County, Mich., operated by Nugent Sand Co., 19,605 man-hours.

Kalamazoo dry-bank plant, Kalamazoo, Kalamazoo County, Mich., operated by American Aggregates Corp., 17,059 man-hours.

Trenton dry-pit plant, Barneveld, Oneida County, N. Y., operated by Eastern Rock Products, Inc., 15,535 man-hours.

Lincoln river plant, St. Albans, Kanawha County, W. Va., operated by Zenith Sand Co., 15,409 man-hours.

Edgerton dry-pit plant, Edgerton, Rock County, Wis., operated by Edgerton Sand and Gravel Co., 13,988 man-hours.

Bedford wet-pit plant, Garfield Heights, Cuyahoga County, Ohio, operated by Schmidt Bros. Sand & Supply Co., 12,269 man-hours.

Warren river plant, Warren, Warren County, Pa., operated by General Concrete Products Corp., 11,532 man-hours.

Fort Gay river plant, Fort Gay, Wayne County, W. Va., operated by Laval Sand Co., 11,371 man-hours.

Titusville dry-bank plant, Titusville, Venango County, Pa., operated by Curry Sand & Gravel Co., 9,091 man-hours.

Muskogee No. 2 river plant, Muskogee, Muskogee County, Okla., operated by Pioneer Sand & Gravel Co., 5,873 man-hours.

Sterling Creek No. 3 river plant, Sterling Creek, Herkimer County, N. Y., operated by Eastern Rock Products, Inc., 5,114 man-hours.

Name Lime Association 1943 Safety Winners

The York plant of the National Gypsum Company at York, York County, Pa., was named winner in the Bureau of Mines-National Lime Association safety competition of 1943 for working 302,951 man-hours during the year without a lost-time injury. Eight

Big Savings

Sauerman Stackline Cableway digs sticky matrix from deep deposit and delivers 70 cu. yd. per hour to carlooding hopper.

This picture shows a Sauerman Tower Machine equipped with a 2½ cu. yd. Crescent scraper bucket digging a flood control reservoir 3000' by 500' and piling the spoil to form an impounding dam.

By the SAUERMAN method of handling materials . . .

Where materials are to be moved distances of several hundred feet or more, a SAUERMAN Drag Scraper or Cableway can cut the cost per cubic yard to a low figure because it is able to dig, haul and place the material in a continuous, straightline operation, doing away with the expense of rehandling. The operation is smooth and rapid, producing large yardage with moderate expenditure of power.

The first cost of a SAUERMAN Machine is reasonable, maintenance amounts to very little, and the simplicity of operation makes it possible to place the control of even the largest installation in the hands of one operator. Moreover, the machine is very flexible, hence it is easy to adapt it to the exact needs of different jobs.

Get This Useful Booklet

Typical examples of pit and bank excavation, levee and canal work, handling coal and ore, deep dredging, stock-piling and reclaiming, etc., are illustrated in the Sauerman catalog. A copy of this booklet is yours for the asking.

SAUERMAN BROS, INC.
574 S. CLINTON ST. CHICAGO 7, ILLINOIS

Coast Guns go into position

EXPERIENCE builds 'em PERFORMANCE sells 'em

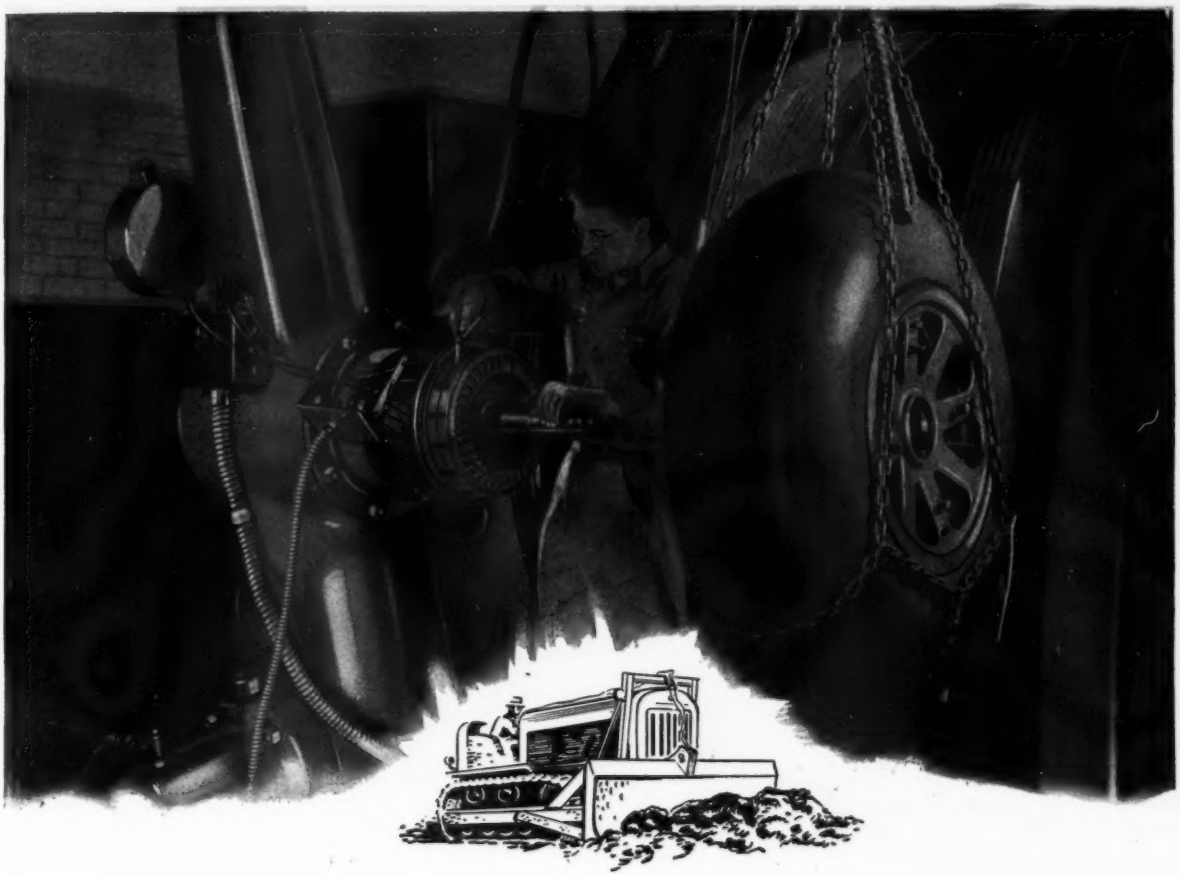
SAFE from Invasion is no idle boast today. The enemy has been driven from the Alaskan outposts and they dare not attack us here!

ROGERS TRAILERS have played a big part in fortifying our coastlines and they are fighting with our men overseas!

on ROGERS TRAILERS

The ROGERS TRAILERS which will be available to industry when present war contracts are completed, will be even better-engineered and more efficient than the thousands which have been operated so successfully for many years.

ROGERS BROS. CORPORATION
ALBION, PENNA.

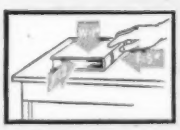


Back of every Velvetouch Installation . . .

Behind each Velvetouch clutch facing and brake lining are years of leadership in developing powdered metal friction materials . . . plus the facilities of a well equipped laboratory devoted exclusively to the study of pairs of *rubbing surfaces.* Modern science and engineering skill can produce no finer friction materials than Velvetouch for brake and clutch replacements in tractors, power shovels and other earth-moving equipment.

THE S. K. WELLMAN COMPANY
1374 EAST 51st STREET • CLEVELAND 3, OHIO

Interesting facts about *Friction*

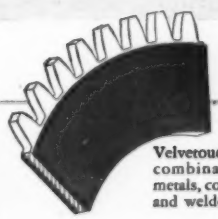


The coefficient of friction (f) of a book sliding across a table top is easily determined by dividing the weight of the book (W) by the amount of force required to slide the book (F).

Because many factors affect the coefficient of friction, i. e. speed, pressure, temperature, etc., it is impossible for any material to have a uniform coefficient of friction under all operating conditions.

The powdered metals in Velvetouch are combined in a wide variety of "mixes" to give the best possible coefficients of friction for each installation.

For Brake and Clutch . . . Use Velvetouch



Velvetouch is *all metal* — a combination of powdered metals, compressed, sintered and welded to a solid steel backing.

other plants, which also operated without a lost-time accident during the year but with fewer man-hours of exposure, likewise will receive Certificates of Honor from the Association, according to W. W. Adams, chief, Accident Analysis Division, Bureau of Mines.

Statistics compiled by T. D. Lawrence and E. K. Elsner of the Accident Analysis Division showed that, in addition to the York plant, the following operations had perfect safety records in the 9th annual competition among limekilns and associated quarries:

Kimbalton plant, Kimbalton Lime Co., Pearlsburg, York County, Pa., 142,740 man-hours; Knoxville plant, Standard Lime & Stone Co., Knoxville, Knox County, Tenn., 121,499 man-hours; Winooski plant, Champlain Valley Lime Co., Chittenden County, Vt., 63,466 man-hours; Quincy plant, Marblehead Lime Co., Quincy, Adams County, Ill., 52,109 man-hours; Marblehead plant, Marblehead Lime Co., Marblehead, Adams County, Ill., 35,076 man-hours; Falls Village plant, United State Gypsum Co., Falls Village, Litchfield County, Conn., 28,660 man-hours; Old Camp plant, Florida Lime Products Co., Ocala, Marion County, Fla., 27,257 man-hours; and Houston plant, Nyotex Chemicals, Inc., Houston, Harris County, Tex., 27,064 man-hours.

Program for Utilization of Phosphate Rock

The program for world utilization of phosphate rock, most of which is required for agricultural purposes, calls for the production of 10,000,000 tons in the agricultural year beginning July 1, 1944, and extending through June 30, 1945, while goals for the following year, 1945-46, will be raised to 12,767,000 tons, the War Production Board reported.

Authorize Completion of Mirage Flats Project

Completion by the Bureau of Reclamation of the Mirage Flats project to irrigate 12,000 acres of land in northwestern Nebraska has been authorized by the President, Secretary of the Interior Harold L. Ickes announced.

Proposed work on the project lands, located near Hay Springs, Nebraska, in Dawes and Sheridan Counties, involves completion of the construction on the Niobrara River of a reservoir of approximately 30,000 acre-feet capacity to provide a full water supply for 12,000 acres of good land which is now being dry-farmed. An earth and rockfill dam, which is now about 60 per cent completed, is the principal engineering feature of the project.

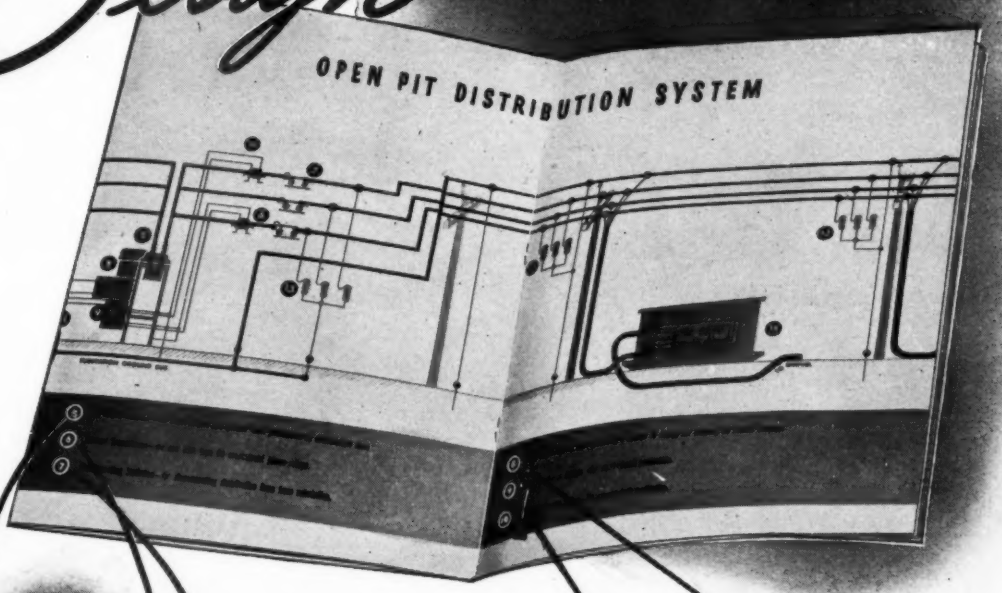
Development of the project, including the construction of a storage dam, a diversion dam, and a distribution system, with the preparation of 12,000 acres of land for irrigation, was approved by the President on April 26, 1940, under the Interior Department Appropriation Act of 1940. Construction was halted, however, by order of the War Production Board on December 12, 1942. Because an adequate water supply for this Nebraska land would increase production of vital food and forage products, the War Food Administrator concurred in a recommendation by the Bureau of Reclamation to the War Production Board that construction be resumed. On January 29, 1944, the War Production Board approved the project for construction under the war food program.

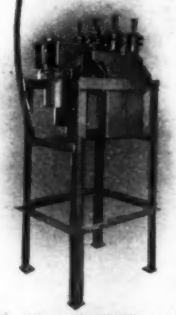
Advancing costs during the period following the original Presidential ap-

LINN HAFTRAKS with contour-following traction, did the tough work in carving out this airport. . . . . .

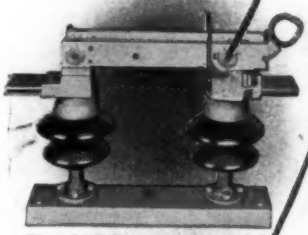
The LINN Manufacturing Corp.
CONTOUR-FOLLOWING TRACTION
Morris, New York

Design FOR SAFETY AND RELIABILITY

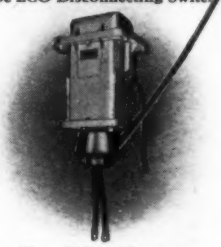




Type FO-22-A Outdoor Oil Circuit Breaker.



Type LCO Disconnecting Switch

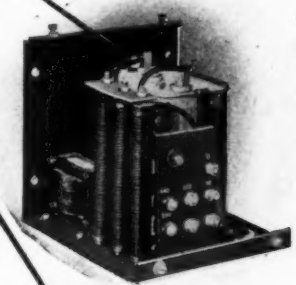


Type WO-15 Current Transformer

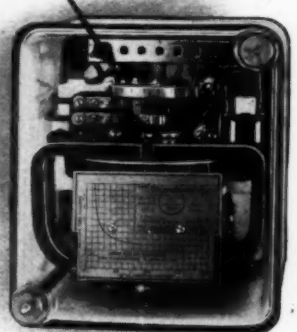
In open-pit mining, there is only one way to assure peak production with complete safety for your employees. Be sure your distribution system has been *designed* to include *every* factor for safety and reliability.

Perhaps your present system is entirely adequate. But it will pay you to check it against accepted standards. Usually, adequate protection can be secured with few changes. Additional equipment may not be necessary—or a few inexpensive protective devices may turn the trick.

To help you in determining whether or not your present system needs a thorough check-up, Westinghouse has prepared a new book on the important subject of open-pit distribution systems. It explains the equipment needed for safety and reliability—and tells why. Complete diagrams, like the one illustrated above, clearly show the advantages you get with the correct equipment. Write today for your copy of B-3282. And if you need the additional help of our engineering staff, just call our nearest office. You'll get their immediate co-operation. Westinghouse Electric & Manufacturing Company, Dept. 7-N, East Pittsburgh, Penna. J-94610



Capacitor Trip Device with cover removed.



Type CO Over-current Relay.

Westinghouse

PLANTS IN 25 CITIES... OFFICES EVERYWHERE

Electrical Equipment for the Mining Industry

proval, delay in shipping and transportation which retarded delivery and added to overhead costs, loss of trained personnel, and other factors contributed toward making it impossible to complete the project without additional funds. The estimated total cost will approach $3,100,000.

Phillips Named Director of Surplus Property Group

Ed. P. Phillips, construction equipment engineer, has been appointed director of the Construction Machinery and Farm Equipment section of Treasury's Surplus Property Division, Ernest L. Olrich, Assistant to the Secretary, announced today. Mr. Phillips is a native of Richmond, Virginia, and is the senior partner of Phillips Machinery Company, with offices in Richmond, Virginia, and Washington, D. C. He was president of Associated Equipment Distributors, in 1943, as well as vice-president of the American Road Builders' Association. He is also a member of the American Society of Military Engineers.

Comstock on Yellowstone River Compact Commission

President Roosevelt has appointed H. D. Comstock, Regional Director of the Bureau of Reclamation's work in the Missouri River Basin, to represent the United States on the Yellowstone River Compact Commission which will meet soon, it was announced by Secretary of the Interior Harold L. Ickes. Mr. Comstock's headquarters are at Billings, Montana.

Motorists Foot Federal Highway Aid Bill

With the nation's motorists paying more than $500,000,000 a year in Federal highway user taxes, by no stretch of the imagination can Federal highway aid be considered a Federal subsidy, according to Charles M. Upham,

(Continued on page 484)

Raising a BLISTER—

Osgood Dependability Helps Speed Construction on Military Hangars

"Somewhere in England" this blister-type hangar is affording weather protection for the men and materials of our engineer troops. And in the foreground is a construction "warhorse" familiar to Army engineers the world over . . . a dependable Osgood shovel.

Whatever and wherever the job — slogging through mud . . . chipping a runway in the flint-like coral of Pacific atolls . . . hacking a road out of African jungles . . . battling the frozen ground along the Alaskan Highway . . . plugging away at the common-place jobs here at home — rugged, powerful Osgoods are giving memorable wartime performance.

This global service, besides helping to win the war, is an exhaustive proving ground for better peacetime excavating equipment for you.

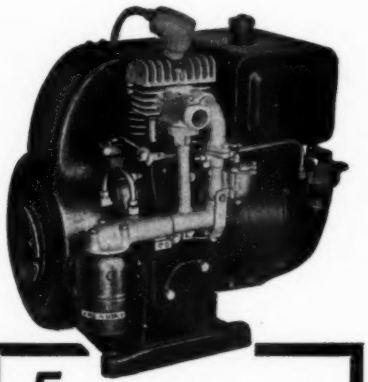
THE GENERAL EXCAVATOR COMPANY — CRANES, DRAGLINES AND SHOVELS — DIESEL, GAS, ELECTRIC

Associated with The General Excavator Company

OSGOOD — CRANES-SHOVELS-DRAGLINES

THE OSGOOD COMPANY • MARION, OHIO

OSGOOD SHOVELS, DRAGLINES CRANES — CRAWLER & WHEEL MOUNTS — DIESEL, OIL, GAS, ELECTRIC



ELECTRICITY

For Any Job—Anywhere

For a dependable source of electricity on projects remote from commercial power, Onan Electric Plants are proven leaders in the field. More than half of the armed Forces' total requirements for Power Plants are built by Onan.

Gasoline-driven . . . Single-unit, compact design . . . Sturdy construction . . . Suitable for mobile, stationary or emergency service.

Over 65 models, ranging in sizes from 350 to 35,000 watts. 50 to 800 cycles, 115 to 660 volts, A.C.—6 to 4000 volts, D.C.—Also dual A.C.-D.C. output types.

Descriptive literature sent promptly on request. D. W. ONAN & SONS, 3281 Royalston Ave., Minneapolis 5, Minn.

ONAN — ELECTRIC PLANTS

Do BOTH Jobs Efficiently!

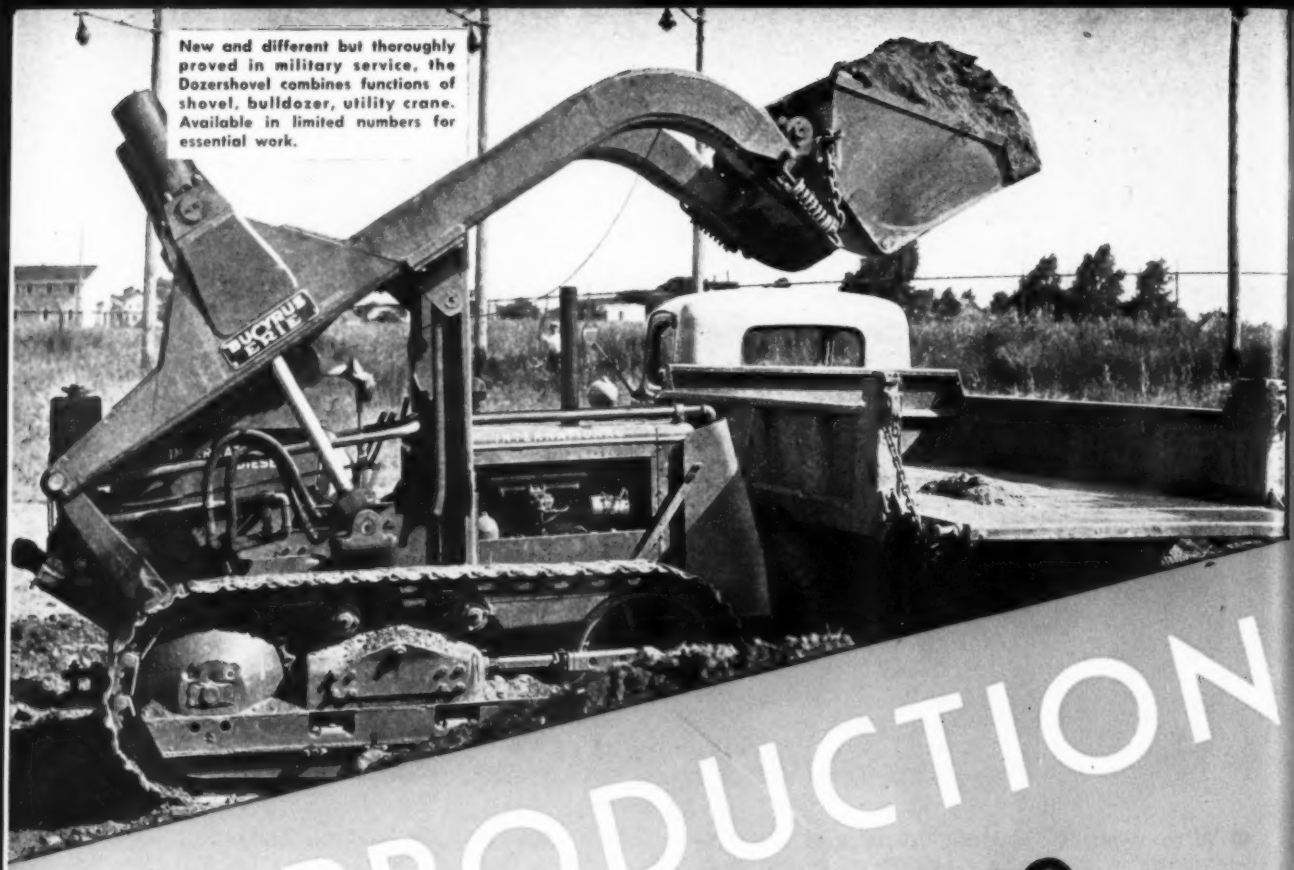
● With modern loading units and Bottom-Dump or Rear-Dump EUCLIDS you can move more dirt on both long and short hauls at lowest cost per yard. Using efficient digging and loading tools and Euclid equipment to haul economically is the surest way to keep costs down and profits up.

Euclids are designed for faster, easy loading under large shovels, elevating graders, draglines, transfer bins, etc. From bumper to bumper they are constructed for efficient off-the-highway service, and have proved their versatility and lower operating cost on hundreds of the toughest jobs.

If you need hauling equipment now for an essential project or are planning for future requirements, be sure to get literature and specifications on models for earth, rock, coal and ore. Your Euclid distributor will welcome an opportunity to provide information, or write us if you prefer.

The EUCLID ROAD MACHINERY Co.
CLEVELAND 17, OHIO

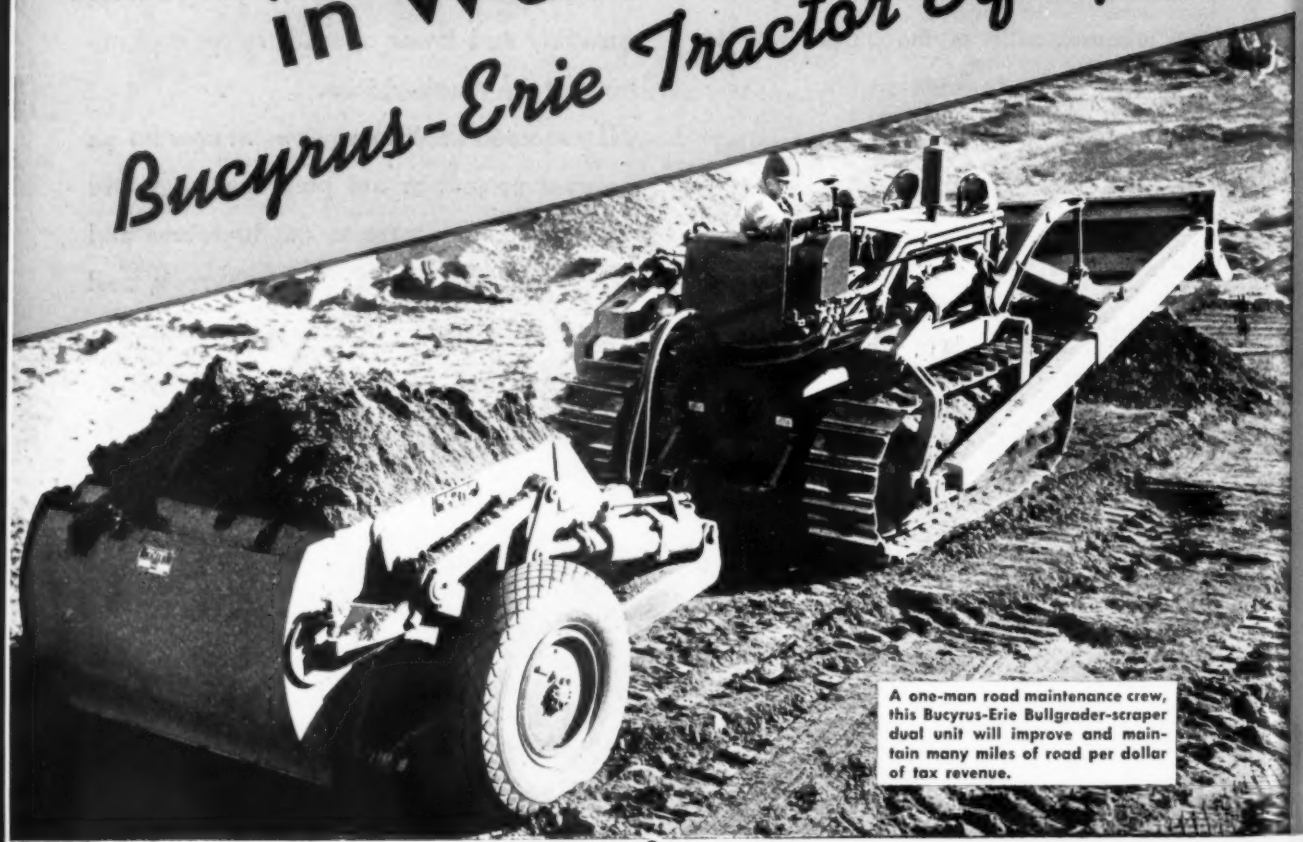
EUCLID SELF-POWERED HAULING EQUIPMENT For EARTH . . ROCK . COAL . . ORE



New and different but thoroughly proved in military service, the Dozershovel combines functions of shovel, bulldozer, utility crane. Available in limited numbers for essential work.

For PRODUCTION in War or Peace

Bucyrus-Erie Tractor Equipment



A one-man road maintenance crew, this Bucyrus-Erie Bullgrader-scraper dual unit will improve and maintain many miles of road per dollar of tax revenue.

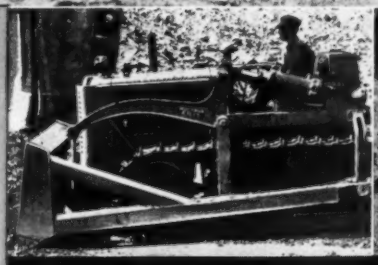
Big payloads and fast digging are two factors which assure you low cost dirt with Bucyrus-Erie four-wheel scrapers.

The heat of wartime construction is still on, and prospects are bright for extensive building in the postwar period, too. To get maximum production now and the most in profits when peace returns, you need equipment that can deliver big output and stand the gaff.

Bucyrus-Erie's war experience added to that gained in more than sixty years in the dirt-moving game has produced tractor equipment that is tops in materials, design, and workmanship. That's why, when you buy Bucyrus-Erie tractor equipment you get the toughest, most productive units on the market. It's the kind of unit you need for wartime road construction now, and it's this kind you'll have to have for big profits after the war.

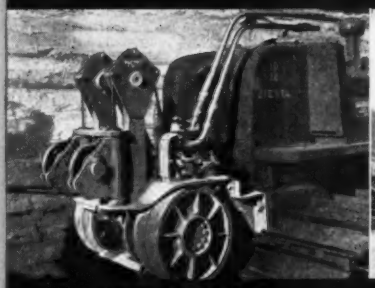
Let your International TracTracTor Distributor tell you about the complete line of Bucyrus-Erie tractor equipment.

N-84



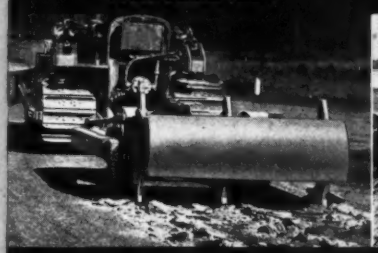
Hydraulic Bulldozers

Hydraulic Bullgraders

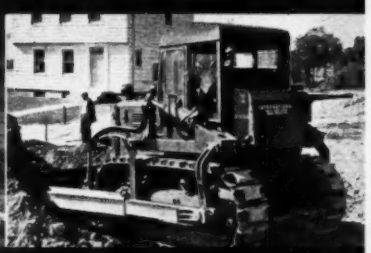


Power Control Units

Cable Rippers



Rotary Rippers



Tractor Cabs

Tamping Rollers

Back-Dump Scrapers

BUCYRUS ERIE TRACTOR EQUIPMENT

SEE YOUR

INTERNATIONAL TRACTRACTOR

DISTRIBUTOR

HAYWARD BUCKETS

PLAY SAFE . . .
CHOOSE HAYWARDS

Hayward Buckets won't fall down on the job, cause time out, or require costly repairs.

THE HAYWARD COMPANY
52-54 Church Street
New York, N. Y.

A Time-Saving ACCESSORY

RED ARCH CHAIN

Red Arch incandescent butt-welded dragline chain has twice the strength and wearability of ordinary chain. It will save you extra money because of less shutdown time. You can get any size chain from ⅜" to 2" to fit your bucket.

T348

BUCYRUS-ERIE COMPANY
SOUTH MILWAUKEE, WISCONSIN

Shots from the Firing Line

(Continued from page 480)

engineer-director of the American Road Builders' Association.

"Motorists by the end of this year will have paid in a total of $5,500,000,000 in Federal highway user levies. They have received back in the form of Federal highway aid $3,391,000,000," Upham said.

Rule on Taxes Applicable to Dredging Work

North Carolina's Attorney General Harry McMullan ruled July 31 that a corporation engaged in dredging work in navigable waters of North Carolina under a contract with the federal government is liable for the bidders' and project taxes imposed by the state revenue act. He held that the fact that the work is being done under a contract with the federal government and in navigable waters affords no exemption.

Utah Announces Progress of Postwar Road Plans

Utah's State Road Commission announced July 29 the progress on its drafting boards of plans for a proposed $30,000,000 program to reconstruct and modernize 495 miles of highway.

The program anticipates enactment of pending federal legislation providing for the appropriation of $500,000,000 a year for three years to the states for road building. Utah's share would approximate $4,800,000 a year.

Utah plans were announced as complete on work estimated to cost $2,000,000, and 50 per cent complete on $5,000,000 additional work. Preliminary engineering costs for the whole program, to be shared by the state and federal government, were estimated at $460,000.

"Coincident with the three-year federal program," it was stated, "the road commission plans to spend each year $600,000 on miscellaneous state road projects and betterments. In addition, the cost of maintaining the 5,438 miles of state roads will be $3,500,000 an-

WELLMAN WILLIAMS TYPE BUCKETS

Williams Buckets have been famous for their many fine mechanical details for nearly 40 years. Since 1931, Williams Buckets have been built by Wellman.

WELDED CONSTRUCTION, featured in Wellman custom-built buckets, which made them so predominant in heavy duty steel mill service, is now applied to all

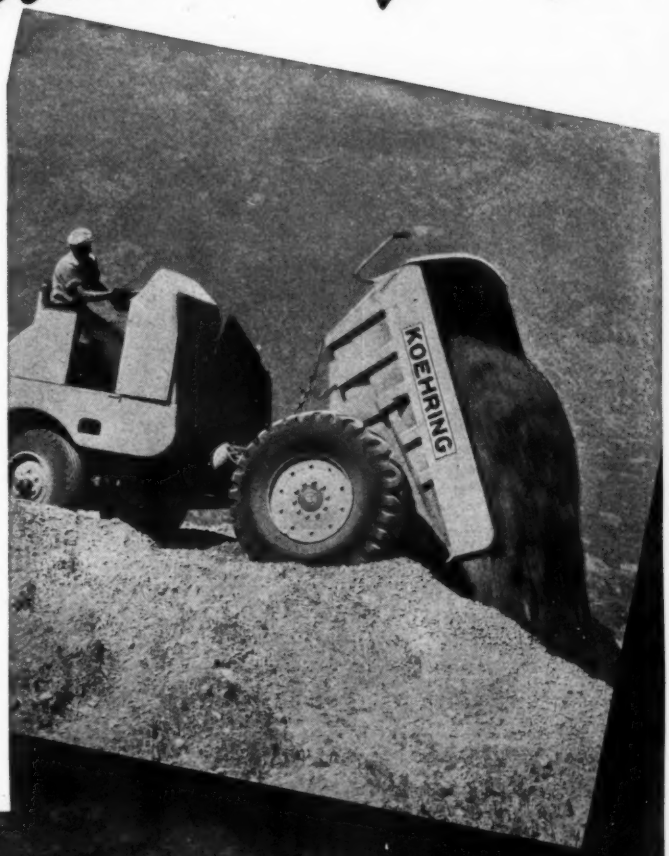
Wellman-Williams Buckets
FOR LONGER SERVICE WITH LESS MAINTENANCE COST

Built in Multiple Rope, Power Arm, and Power Wheel Types in ⅜ yd. to 16½ yd. capacities.

Send for Free Bulletin Tell us about your particular requirement and we will send full description of construction and features in special bulletins which clearly prove why YOUR NEXT BUCKET SHOULD BE A WELLMAN.

THE WELLMAN ENGINEERING COMPANY
7002 Central Avenue • Cleveland 4, Ohio
Sales and Service Agencies in principal cities.

Instantaneous Dumping



ROCK *or* DIRT
Dumped Instantaneously

Moving rock or dirt at high speed requires speed in all operations. Koehring Dumptors save seconds every time the load is dumped . . . instantaneously. Seconds saved speed production. Rock or dirt is dumped equally fast and the load is dumped clean every time . . . ready for a full load every trip. KOEHRING DUMPTORS HAUL ROCK OR DIRT FASTER THAN ANY OTHER METHOD.

KOEHRING COMPANY
Milwaukee 10, Wisconsin

DEPEND ON YOUR KOEHRING DISTRIBUTOR to help you keep your equipment operating. Care for your Koehring equipment *NOW*, so it will serve you tomorrow. Koehring distributors have genuine Koehring parts. Koehring parts warehouses are at your service.

ARMY E NAVY

KOEHRING HEAVY DUTY

HEAVY-DUTY CONSTRUCTION EQUIPMENT

nually. This figure, which is about $1,000,000 in excess of the prewar maintenance expenditure, will be necessary in the restoration of the roads after the war and will continue indefinitely as the minimum amount for the maintenance of federal aid roads and secondary roads to the required standard. There is the further consideration that the last two legislatures have added 300 miles of local roads to the state road system.

"The commission's road equipment is steadily wearing out and has had practically no replacement with new units during the past three years. An expenditure of $1,000,000 is now in sight as the minimum requirement for replacing obsolete and worn-out trucks, tractors, graders and other motorized equipment. It is estimated that equipment replacement charges will be $550,000 in each of the first three years after the war. Fixed charges for administration of the state roads, including general office and district administration office, shop and laboratory equipment and supplies, road signs and signals, appropriations from the gasoline tax for policing and accounting, and numerous other items total $625,000 annually."

The commission said the proposed state expenditure during the first year of the postwar program is estimated at $5,475,000 or nearly $2,000,000 short of estimated road commission revenues for that year. This extra amount, the commission said, "will need to be obtained from financial sources not now available to the commission."

North Dakota to Vote on Highway Certificate Proposal

North Dakota's electorate will vote at the November general election on a proposal to permit issuance of up to $12,360,000 in highway revenue anticipation certificates for postwar road construction and improvement.

Petitions to initiate such a law were filed July 31 with the secretary of state by Martin Aas of New Rockford, president of the Postwar Highway Improvement Association of North Dakota. He said the petitions contained 21,210 signatures and that every county in the state was represented.

Under the proposed legislation, funds obtained by sale of the certificates could be used only for matching federal funds made available to the state for highway construction. The certificates would not be general obligations of the state but would be redeemed by funds from the present one-cent gasoline tax.

The proposed act does not require the certificates to be issued immediately and provides no minimum limitation. It would require the certificates to be sold at bid and at par or better and certificates could not draw interest at more than three per cent. It is estimated by the proposal's sponsors that the certificates, if issued to the permitted maximum, could be retired from the one-cent gasoline tax receipts in from 12 to 14 years.

Ask Co-ordinated Plan For Missouri Flood Control

The Missouri River States Committee concluded a two-day conference August 6 in Omaha with the adoption of a resolution calling upon the President and Congress "to direct the U. S. Army Engineers and the U. S. Bureau of Reclamation to bring before Congress a coordinated plan" for over-all development of the Missouri River based on the omnibus flood control bill, Bureau of Reclamation plan, and rivers and harbors omnibus bill.

The resolution adopted by the nine-state committee declared that such a coordinated plan "will make possible the authorization by Congress, now, of the Missouri River basin development program in its entirety by such amendments to legislation now pending as are feasible from the standpoint of legislative procedures."

Seven of the states, with Missouri opposed and Iowa not represented for voting, adopted a separate statement that "nothing done in the interests of navigation shall adversely affect the use of water for irrigation west of the 97th meridian."

Rejected by the committee was a proposal in the original resolution, introduced by Gov. John Moses of North

Longer Life through
PROPER LUBRICATION

WIRE ROPE is continually fighting a battle-royal with corrosion, friction and wear. Because of the hazards involved, it is neither safe nor economical to use a rope whose original strength has been reduced (by either corrosion or wear) to a point where it no longer affords an adequate factor of safety.

But the safe life span of a wire rope can be greatly extended by keeping it correctly lubricated at all times. The lubricant applied during manufacture will not last indefinitely.

The greatest harm resulting from incorrect or insufficient lubrication is the rust and decay that takes place within the rope. For the most part corrosion is an "undercover" worker as its action is not always visible until too late.

Friction and wear fight hand in hand. Their attack is both within and without. Every time a wire rope bends there is a sliding movement of both wires and strands where they contact with the sheaves and drum.

Proper lubrication will help wire rope win its battle for Longer Life, as it lessens friction, promotes flexibility, reduces wear and retards corrosion. The right kind of lubricant to use and the frequency with which it should be applied, depend upon the conditions under which the rope is operating. We shall be glad to give further details on this important subject.

Important: *An idle wire rope is more vulnerable to corrosion than one in use. So be sure to give your ropes the protection of a good lubricant when they are not in service.*

A. LESCHEN & SONS ROPE CO.
WIRE ROPE MAKERS — ESTABLISHED 1857
5909 KENNERLY AVENUE — ST. LOUIS, MISSOURI, U. S. A.

NEW YORK • • • 90 West Street
CHICAGO • • 810 W. Washington Blvd.
DENVER • • • 1554 Wazee Street
SAN FRANCISCO • • 326 Fourth Street
PORTLAND • • 914 N. W. 14th Avenue
SEATTLE • • 3410 First Avenue South

TALK ABOUT CONVERSION—

Read These Facts!

Before—

Beu & Sons, Sumner, Iowa, "190-G" Universal crushing, screening and loading plant with 10"x36" jaw crusher, is shown producing aggregates near Pine Lake State Park, Hardin County, Iowa. Output averaged 1,500 yards per 10½ hour day from an unusually deep pit and ran as high as 2,200 yards in a 12½ hour day.

This progressive contractor recently took a contract for agricultural limestone in northern Iowa.

After—

The jaw crusher on the "190-G" was readily replaced by a Universal No. 4 hammermill and a Universal primary unit consisting of a 20" x 36" roller bearing jaw crusher with apron feeder was added providing a "tailor made" plant capable of handling the new contract. The revamped plant is shown operating near Ackley, Iowa. As much as 125 tons of aglime per hour have been turned out, averaging better than 100 tons per hour.

This is another case where standard Universal units were economically used to readily convert a plant. There is no end to the variety of combinations that are possible using standard Universal "packaged units."

Handle aggregates today, riprap tomorrow, ballast next month.

Universal engineers and field men have the answers to your conversion problems.

UNIVERSAL ENGINEERING CORP.
610 C Avenue, West Cedar Rapids, Iowa

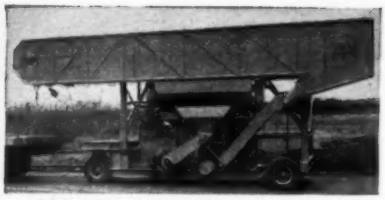
ARMY E NAVY

UNIVERSAL

CRUSHERS, PULVERIZERS, COMPLETE PLANTS, SPREADEROLLERS, PORTABLE ASPHALT PLANTS

Start Post-War Planning Now!

ERIE
PORTABLE PLANT
MAKES CONCRETE
ON THE JOB



• Make 20 to 40 yards of specification concrete per hour on the job. One-man operation and a helper to handle cement bags. One hour to set up. Moves from job to job. Write for booklet.

ERIE STEEL CONSTRUCTION CO • ERIE, PA.
AggreMeters • Buckets • Concrete Plants • Traveling Cranes

Dakota, providing for establishment of a Missouri River Commission, which would have comprised a representative from the Army Engineers Corps, the Bureau of Reclamation, "one other federal agency having an interest in the economic development of the entire Missouri River Valley" and one member each from the Lower Missouri valley and the Upper Missouri valley.

During the conference Brig. Gen. Miles Reber, Washington, former Missouri River division engineer, explained the Army Engineers Corps' plan for Missouri River development, known as the Pick plan, and W. G. Sloan, Billings, Mont., assistant regional director of the Bureau of Reclamation discussed the bureau's plan.

Gov. M. Q. Sharpe of South Dakota, chairman of the committee and spokesman for the group, said that if the evidence presented by General Reber and Sloan "can be accepted by all those concerned, there would be no dispute over water rights." He said both "agreed there is enough water for irrigation, navigation, and reclamation."

Advocate Federal Aid for National Airport System

An integrated federal-local national airport system to be financed jointly by federal and local governments was favored by members of the Chamber of Commerce of the United States through a referendum vote, the results of which were recently announced.

The approved recommendations respecting airport construction follow:

1—To replace the recent trend toward financing of airport construction mainly by the federal government and direct appropriations for particular airport projects, a federal-aid airport system should be established.

2—Federal funds for airports should be matched by at least equal amounts of state or local funds for the same uses.

3—Federal funds should be restricted to grading, drainage, construction of runways, lighting and other safety features.

4—Federal funds should be apportioned by an equitable formula taking account of the needs of the various states and localities from the viewpoint of a county-wide airport system, with due consideration to the provision already made of airports from defense and war expenditures.

5—State or local jurisdictions should be required to provide land, buildings and maintenance.

6—A major part of such a program should be reserved for periods of low business activity.

7—Administrative and financial responsibility for airport work should be concentrated in a single agency in each jurisdiction—federal, state and local.

8—There should be airport planning surveys in each state to be conducted in cooperation with the federal agency on the one hand and local airport authorities on the other.

9—Plans for airport systems should recognize that privately owned and operated airports constitute about one-half of the total number of existing airports, although a much smaller fraction of the total expenditures thereon, and that these private airports represent investments of great importance to future development of aviation.

10—Government - financed airport projects which would result in destructive competition with existing private airports serving the same areas and types of aviation service should not be undertaken.

11—Publicly owned airports should as soon as practicable be put on a self-sustaining basis.

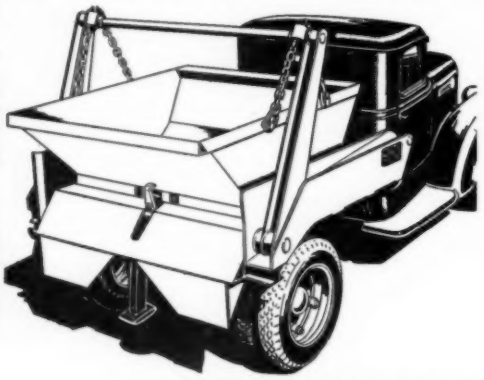
Of these proposals the closest vote was on No. 6, which was approved by 1,443 to 457. The chamber interpreted this to mean that many members do not favor deferment of projected airport construction until the business cycle swings downward.

Brazil has Money for 50-mile Road

The equivalent of $247,000 has been made available in Brazil for construction of a 50-mile highway between Patos and Pianco, centers for cotton and cattle production. The road will connect with one of the principal highways and probably will be extended eventually into an area where small quantities of cotton, sugar, hides and tobacco are produced.

LOADING
HAULING
DUMPING

SERVICE STRIPES
for speeding up production



Brooks LOAD LUGGER

is doing a great war-time job . . . speeding up the movement of materials and utilizing manpower to best advantage. Its service record shows the Load Lugger will be a leader in post-war material handling jobs, such as excavating, road building, quarry operations and hosts of reconstruction projects. Write for Catalog No. 44.

Ask about the new TrucKrane Boom Attachment for use with Load Lugger.

309 Davenport Road Knoxville 8, Tenn.
Distributors in all Principal Cities

Brooks EQUIPMENT AND MFG. CO.

There isn't a soft spot in a quarry, and any piece of equipment that can't take a beating had better stay at home.

That goes for wire rope, too—and it's one of the reasons why Bethlehem Purple Strand gets the roughneck assignments. You'll find Purple Strand rope on the boom and hoist lines of power shovels; you'll find it on dragline equipment, and in the holding and closing lines of grab buckets . . . tough, wearing jobs, every one of them.

In this kind of work, where the rope is often required to pass around small sheaves, Purple Strand Form-Set (preformed) is frequently specified over the non-preformed type. Form-Set is preferable, too, in derrick and crane service where the motion of the suspended load tends to twist the lines, for its "life expectancy" is considerably greater than that of ordinary rope.

The tougher the job, the more you need Purple Strand—either Form-Set or non-preformed, as circumstances require. Why not ask a Bethlehem man to explain its solid advantages?

When you think WIRE ROPE

. . . think BETHLEHEM

NOT in the Contract

An officer approached the young man in the neatly fitting uniform and asked:

"What's the eighth general order?"

"I don't know," the fellow admitted.

"Have you ever been on guard duty?"

"Nope."

"Don't you know enough to say 'sir,' either? What outfit are you in?"

"Me? I'm the Coca-Cola man."

With a grinding of brakes, an officer pulled up to the side of the road.

"Say, Sonny," he called to a boy. "Have you seen an airplane come down anywhere near here?"

"No, sir," declared the boy sticking his slingshot in his shirt. "I've only been shooting at a bottle."

Young Miss on Lake trip for her vacation to one of the ship's officers: "My good man, where is the captain?"

He: "He's forward, Miss."

She: "I don't care—I'm on a pleasure trip."

Father: "Son, fetch the old horse."

Son: "Why the old one, father?"

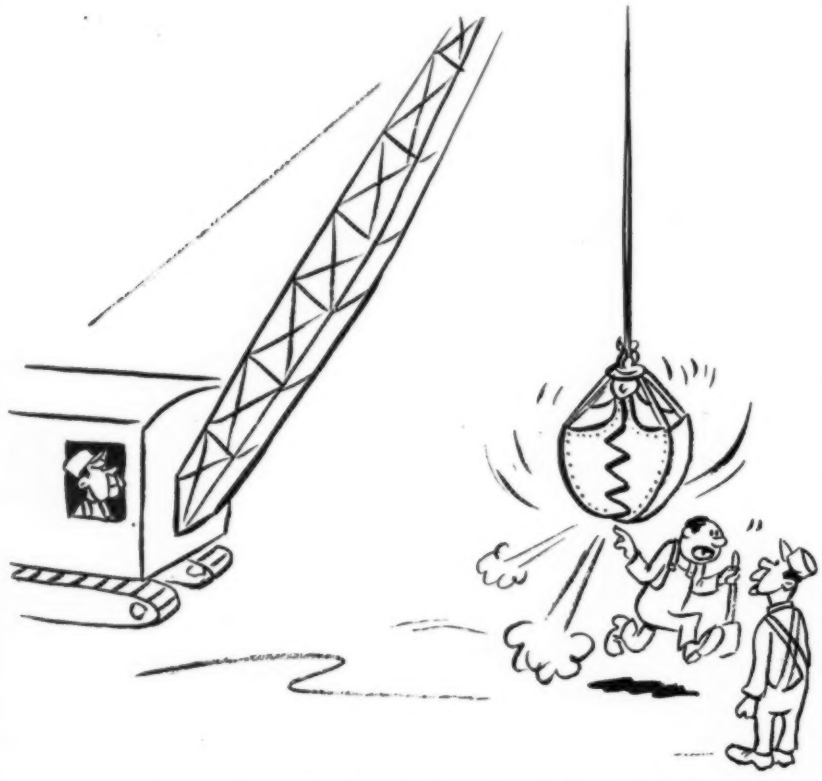
Father: "My motto is: Wear out the old one first."

Son: "Then you fetch the horse, father."

The social worker was talking to a girl in a slum district and said, "Where is your father?" "Oh, Pop's in the penitentiary," the girl replied. "What about your mother?" "She's out here in an insane asylum," answered the girl. "And your sister?" "She's been in the Reform School a couple of years." "Well, that just leaves you and your brother. Where is he?" "He's at Harvard." "What, you mean your brother is in college? What's he studying?" "Oh, he ain't studying nothing. They're studying him."

"Now that I've told you about my past, do you want to marry me?" "Sure, baby."

"I suppose you'll expect me to live it down?" "No! I'll expect you to live up to it."



"Gus is sure grouchy, he almost bit my head off twice today!"

A young engaged couple were killed in a motor accident the day before they were to have been married. On their arrival at the pearly gates they were met by St. Peter, who welcomed them, saying that he hoped they would have a happy time.

"Yes," said the girl, "but you know we were killed the day before our wedding."

"All right," said St. Peter, "I'll fix it up for you."

A month passed; then a year; and as there is no such thing as time in Heaven, 500 years passed. Then the girl met St. Peter.

"Look here," she said, "have you forgotten about my wedding?"

"Oh, no," said St. Peter, "I haven't forgotten—I'm waiting for a parson."

Patient's Wife—Is there any hope, doctor?

Doctor—Well, I don't know. What are you hoping for?

And here is a story that offers another good example of relativity! When a famous actress was at the summit of her beauty and fame, she met, at a semi-royal dinner, an African king. The lovely lady sat beside this king. She did her very best to amuse and please him. At the dinner's close, he sighed and said, "Oh, madam, if heaven had only made you black and fat, you would be irresistible!"

"You're an apt boy. Is your sister apt, too?"

"If she gets a chance, she's apt to."

Lady (holding a cookie above a dog):

"Speak! Speak!"

Dog: "What'll I say?"

"When there's a will, there's a way." A young mother of newly born triplets was being congratulated by one of her girl friends. "Oh, yes," she said, "we are just divinely happy and it was truly wonderful too, because you know triplets happen only once in 15,875 times."

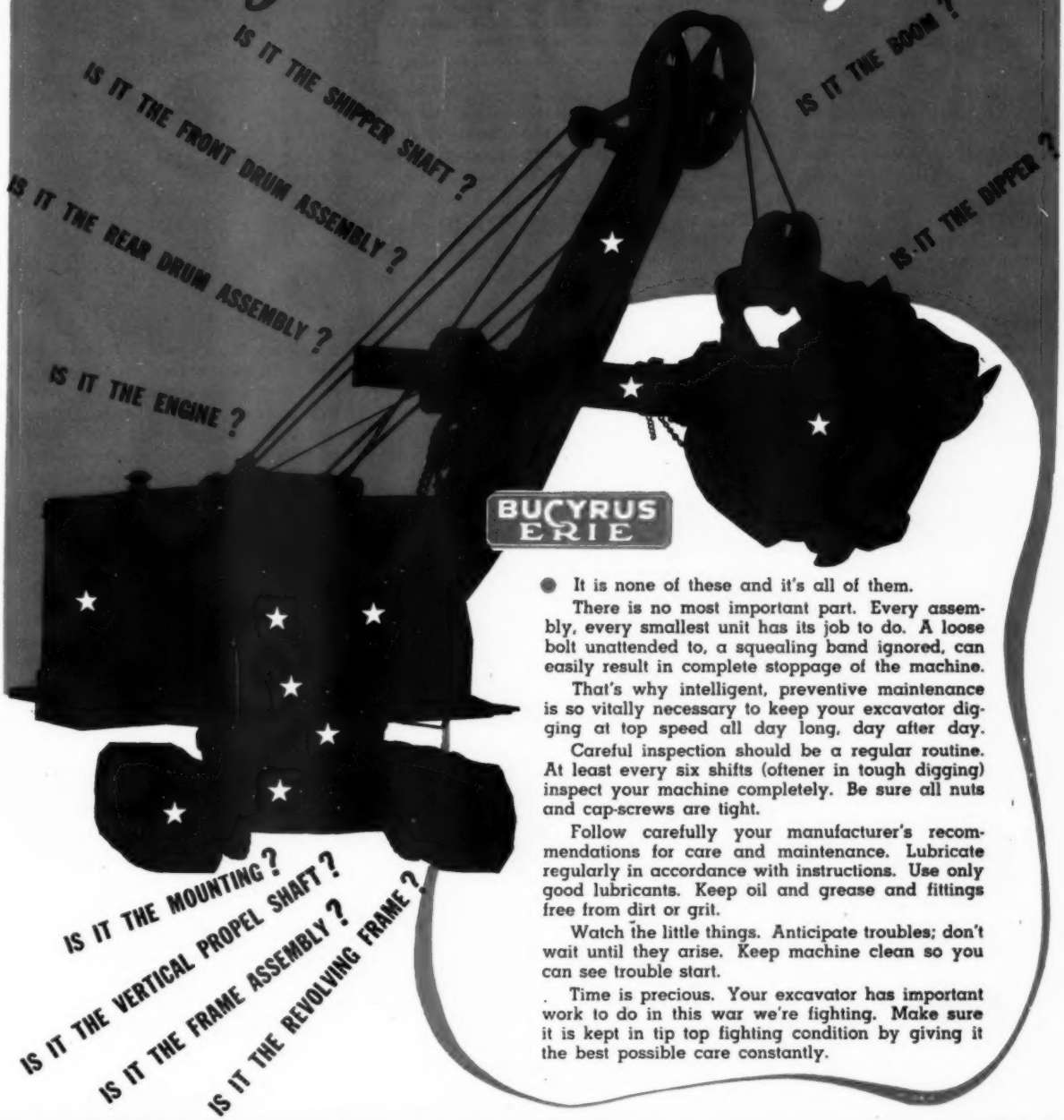
Mother: "Now, before you get serious with him, be sure he is always kind."

Daughter: "Oh, I'm sure he is. I heard him say that he put his shirt on a poor horse that was scratched."

Minister (dinner guest): "And what will you do when you get as big as your mother?"

Little Jane: "Diet."

What is the Most Important Part of an Excavator?


IS IT THE SHIPPER SHAFT?
IS IT THE FRONT DRUM ASSEMBLY?
IS IT THE REAR DRUM ASSEMBLY?
IS IT THE ENGINE?
IS IT THE BOOM?
IS IT THE DIPPER?
BUCYRUS ERIE
IS IT THE MOUNTING?
IS IT THE VERTICAL PROPEL SHAFT?
IS IT THE FRAME ASSEMBLY?
IS IT THE REVOLVING FRAME?

● It is none of these and it's all of them.

There is no most important part. Every assembly, every smallest unit has its job to do. A loose bolt unattended to, a squealing band ignored, can easily result in complete stoppage of the machine.

That's why intelligent, preventive maintenance is so vitally necessary to keep your excavator digging at top speed all day long, day after day.

Careful inspection should be a regular routine. At least every six shifts (oftener in tough digging) inspect your machine completely. Be sure all nuts and cap-screws are tight.

Follow carefully your manufacturer's recommendations for care and maintenance. Lubricate regularly in accordance with instructions. Use only good lubricants. Keep oil and grease and fittings free from dirt or grit.

Watch the little things. Anticipate troubles; don't wait until they arise. Keep machine clean so you can see trouble start.

Time is precious. Your excavator has important work to do in this war we're fighting. Make sure it is kept in tip top fighting condition by giving it the best possible care constantly.

ARMY E ★★ NAVY

Bucyrus-Erie

SOUTH MILWAUKEE, WISCONSIN, U. S. A.

Equipment you ought to KNOW ABOUT

Blasting Plug

Manufacturer: The Heitzman Safety Blasting Corporation, Shemokin, Pennsylvania.

Claims: The plug comes in various sizes to fit any size drill-hole. It is made of asbestos, shaped as a cylinder, with a wooden expansion wedge inserted, which when tapped with the loading pole, causes the asbestos plug to expand to fill and seal the drill-hole directly above the powder charge, making it air-tight and water-tight. The net result from the use of the plug in wet places is a tighter and better seal for the explosive. The plugs are light in weight, simple to handle. They cannot burn, smoke or create a gas or any odor. They cannot damage a fuse or a leg wire in any manner.

Welding Positioner

Manufacturer: Harnischfeger Corporation, Milwaukee, Wis.

Claims: Featuring flexibility of use, simplicity and ease of operation, this 2500-pound capacity welding positioner is designed for production line welding as well as job work, maintenance, etc. As in senior models, construction throughout is all-welded rolled steel. Table is 42 inches diameter, has 18 handy radial slots for mounting fixtures and is turned manually to suit welding speed. Tilting is controlled by hydraulic power with 135 degrees beyond horizontal position attainable. Both table movements have self-locking devices and telescopic column with self-locating stops provided for table elevation from 28 inch to 60 inch. Portable, or column-in-floor mountings are available.

For further details about the equipment on these pages please write to the manufacturer, mentioning Excavating Engineer.

LaPlant-Choate Trailbuilder

Manufacturer: LaPlant - Choate Manufacturing Co., Inc., Cedar Rapids, Iowa.

Claims: This cable-operated "Trailbuilder," designated as model R-82R, and designed for mounting on "Caterpillar D-8" tractor, retains the structural features of this company's dozer line, but the cutting edge has been reinforced with more bolts compared with earlier models. The cutting bits at either end of the blade are single plates formed to fit the ends of the blade for greater wear resistance in rock cuts. The front overhead is a new design for increased strength and better appearance.

The blade can be raised a maximum of 50 inches, or dropped 72 inches below the ground line. This movement is accomplished by means of "Caterpillar" double drum power control unit. A single cable is used.

Steel Cable Conveyor Belts

Manufacturer: Goodyear Tire and Rubber Company, Akron, Ohio.

Claims: Conveyor operations extending as far as six and one-half miles in a single belt will be possible with Goodyear's new steel cable "compass" conveyor belts.

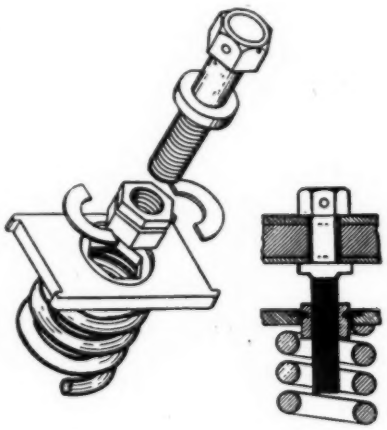
The cables are laid in parallel, side-by-side for the full length of the belt, in a single plane. The cables are brass-plated prior to being covered with rubber, thus obtaining adhesions —rubber to steel—much higher than were possible in steel-to-cotton.

The flex life of the steel cables far exceeds that of cotton-cord, rope or fabric. For example, 3/64" OD steel cable is so small that it enjoys a ratio of 1000 to 1 when flexed over a conventional 48-inch head pulley, whereas good wire rope practice would ask for a ratio of sheave to cable diameter of 80 or 100 to 1.

With steel cables, not exceeding 5/32 of an inch OD and an overall belt thickness no greater than the conventional 6-ply structure, a strength equivalent to 60 plies of heavy duck is available. This means that it is possible to operate a fully loaded 36-inch wide belt a distance of 6½ miles—13 miles of belting in one piece. With this new cable-belt, 1000 tons per hour can be handled up a mile long slope—32% slope all the way—on a single 42-inch wide belt.

Using a single belt for a long haul is particularly advantageous in handling sticky or lumpy materials, which might not readily transfer from one belt to another.

This announcement of the general availability of steel cable belts for conveyors comes after test installations made by Goodyear have been in operation for over two years.

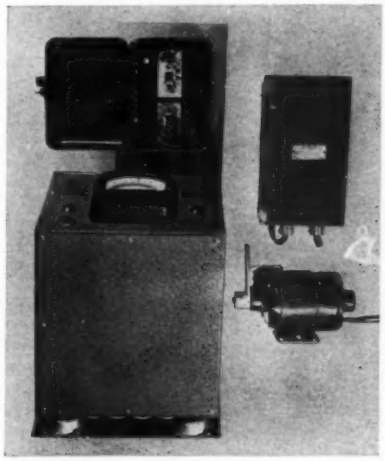


Shear Plates

Manufacturer: Iowa Manufacturing Co., Cedar Rapids, Iowa.

Claims: These shear plates are a safety improvement against roll breakage on aggregate crushers. Heavy helical springs of chrome vanadium steel maintain proper tension on the floating roll and keep the opening for material constant, but when uncrushable foreign material is introduced the springs protect the roll by relieving the undue stress. If exceptionally large uncrushable material, such as tramp iron, passes into the rolls it causes the nut to shear

the plate and allow the unrestrained bolt to pass through the spring and instantly release all tension on the floating roll. The shear plates are replaceable and extra ones are furnished with each crusher.



Crane Stability Gauge

Manufacturer: General Electric Company, Schenectady, N. Y.

Claims: This new stability gauge is designed to safeguard boom-type cranes and similar equipment by continually and accurately measuring its stability in handling loads in excess of the rated capacity at a given radius, and safeguards against extending the boom to an excessive radius for a given load. The indicating instrument signals the operator when the power is on and when the crane reaches unsafe limits of operation. The gauge measures the tipping moment or the degree of crane stability by determining the amount of deformation in the structural member of the crane upon which a strain gauge is mounted. It consists of a strain gauge and an accompanying balancing unit, an indicating unit, a constant-voltage transformer, and a boom-angle compensator. The units are enclosed in sturdy metal cabinets which can be readily opened for inspection or servicing.

Hot Poured Joint Sealing

Manufacturer: Servicised Products Corporation, 6051 W. 65th Street, Chicago, Illinois.

Claims: This compound is a substitute for the former hot poured rubber sealing waterproof compound. Known to the trade as para-plastic this substitute has been developed with non-critical materials and the sealing qualities conform with Federal Specifications SS-F-336 covering the hot poured sealing compound. The seal bonds firmly with concrete, steel or wood or seals against infiltration of water or any other foreign material. A feature of this material is the fact that it will extend to several times its original thickness and still maintain its original seal. It is not affected by ordinary change of summer or winter weather.

Bolt or Cable Cutter

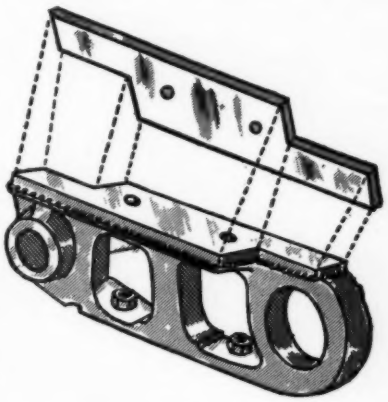
Manufacturer: Techtmann Industries, Inc., 828 North Broadway, Milwaukee, Wis.

Claims: Will cut up to ¼-inch bolts or wires, and ⅜-inch stranded cable. Has an overall length of 15 inches, weighs 26 ounces, and has a leverage range of 40 to 1. The standard blades are made of tool steel and will meet all cutter requirements in general commercial practice. The cutting blades are replaceable and may be easily removed by turning off a screw end nut. A small instantly adjustable cam permits wear allowance for sharpening of dulled edges. Insulated handles with high dielectric strength are optional.

Automatic Boom Control

Manufacturer: Industrial Equipment Company, 59th and Doyle Sts., Emeryville 8, California.

Claims: Provides positive protection against costly accidents resulting from raising crane booms beyond safe elevation. The Thomas Automatic Boom Stop Control, as it is called, is an air or vacuum-operated system which disengages the main drive clutch instantly the moment the boom is raised above safe limits. A limit control valve immediately releases the air or vacuum pressure in the system causing the spring-loaded clutch booster cylinder to disengage the clutch and stop further boom raising. It stops the boom without shock and places no dangerous strains upon heavily loaded booms.



Crawler Repair Plates

Manufacturer: Allied Steel Products, Inc., Cleveland, Ohio.

Claims: Special steel plates, fabricated to correct sizes to fit the track link casting, can be affixed by gas or electric welding, to restore the original worn casting to its original weight and thickness. These plates are made of a special work-hardening steel which becomes harder and tougher with use. Approximately 200 pounds of these special plates will save the purchase of a ton of castings. The plates are obtainable immediately from stock.

Automatic Oil Reclaimer

Manufacturer: Youngstown Miller Company, Sandusky, Ohio.

Claims: A new line of YM "Robot" oil refiners designed to clean lubricating oil with continuous and automatic operation. This machine utilizes common refinery earths available on the open market. It is capable of removing fuel dilution, acids, solid and colloidal carbon, dirt and similar foreign matter. It can also restore oil emulsified by water. When piston varnish and sludge deposits are present, the manufacturer offers a guarantee on removing them and preventing recurrence. Ability to restore transformer oils to 30,000 volt dielectric strength is also claimed for this machine. All models of the reclaimer are designed to restore used oils to substantially the same fire, flash, viscosity, color, neutralization number and precipitation number as the new parent oil.

Notes from the manufacturers

Caterpillar Tractor Co., Peoria, Ill., announces the resignation of Howard R. Murphy, manager of the merchandise department, effective July 31. Murphy is now associated as a principal with W. K. Holt in the equipment distributor business in San Antonio and Corpus Christi, Texas.

Fruehauf Trailer Company, Detroit, Mich., is conducting a nation-wide safety contest for all of its Branch service branches. The contest is from July 1 to December 31, 1944.

The S. K. Wellman Company, Cleveland, Ohio, has elevated W. E. Canfield from Assistant to the President to Vice-President in charge of sales. Other newly elected officers are: J. R. Nurney, executive vice-president; R. LaFrance, vice-president in charge of plant operation; F. F. White, treasurer, W. H. Faber, assistant treasurer, and C. T. Cox, assistant secretary.

Insley Manufacturing Corporation, Indianapolis, Indiana, has appointed George J. Dimond sales manager to succeed Ray W. Dorward, retired. Mr. Dimond was with The Koehring Company of Milwaukee for 25 years and was sales manager when he retired to join Insley.

Athey Truss Wheel Co., Chicago, Ill., has promoted B. F. Lease to vice-president in charge of sales, advertising and service.

Bucyrus-Erie Company, South Milwaukee, Wis., announces the fourth receipt of the Army-Navy award for outstanding achievement in producing materials essential to the war effort.

Iowa Manufacturing Company, Cedar Rapids, Iowa, recently named Frank P. D'Aquila, lecturer-author on Latin American relations, export sales manager.

The Osgood Company and The General Excavator Company, Marion, Ohio, announces the following seven new distributors have been named in preparation for the anticipated expansion in construction, excavating and materials handling fields after the war: Acme Equipment Company, Detroit; Arthur C. Leake, Middletown, Va.; Municipal Sales Company, Richmond, Va.; Walling Tractor and Equipment Corporation, Portland, Oregon; H. L. Baxter, Toronto, Ontario; Rousseau Equipment Co., Winnipeg, Manitoba; and Dominion Distributors, Ltd., St. John's, Newfoundland.

LaPlant-Choate Manufacturing Co., Inc., of Cedar Rapids, Iowa, has appointed C. H. Lage general works manager in charge of all plant operation and production.

ASD

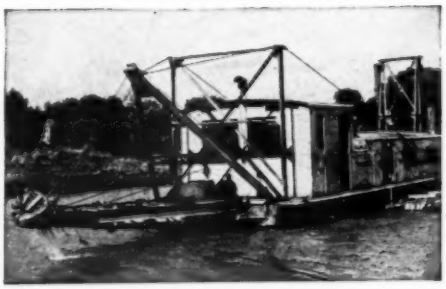
DREDGING EQUIPMENT

HYDRAULIC - DIPPER - CLAMSHELL

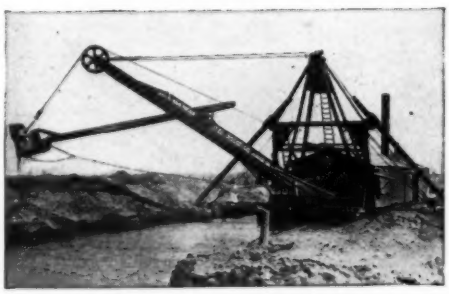
Complete integrated units, each designed for specific performance.

Bolted sectional steel hulls, power and pumping units, spuds, frames, ladder or booms are shipped by truck, rail and/or as hold cargo. May be easily assembled at inland site and dismantled for relocation after project is finished.

ASD dredges are backed by 40 years of dredge engineering and operating experience.



HYDRAULIC DREDGES
Sizes 8 inches up



DIPPER and CLAMSHELL
¾ cu. yd. up

We invite inquiries now for post-war delivery.

Write for catalog, photos and data sheets.

AMERICAN STEEL DREDGE CO. INC.
FORT WAYNE 1 · INDIANA · U.S.A.

POSITIONS WANTED HELP WANTED

Address all box numbers c/o EXCAVATING ENGINEER South Milwaukee, Wis.

EXPERIENCED OPERATOR

Shovel, crane, pull shovel and dragline operator. Capacities from ½ yd. to 5 yds. Steam, gasoline, diesel and electric. Can operate Bucyrus-Erie 120-B, Bucyrus-Monighan 5-W, Koehring, Northwest, P&H, Lima and Bay City machines. Also locomotive cranes. Prefer Bucyrus-Erie. 26 years experience. 2 years in South America. Willing to go any place in U.S.A. or South America. Not in the draft. Can overhaul and repair all makes of machines. Now located Wisconsin.
Box 9232

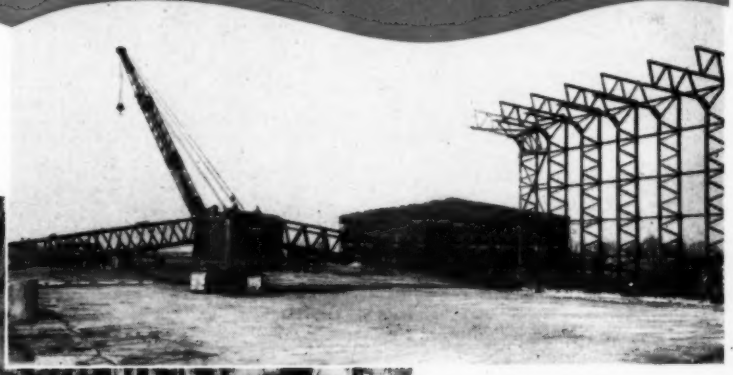
Shovel and Crane Operator

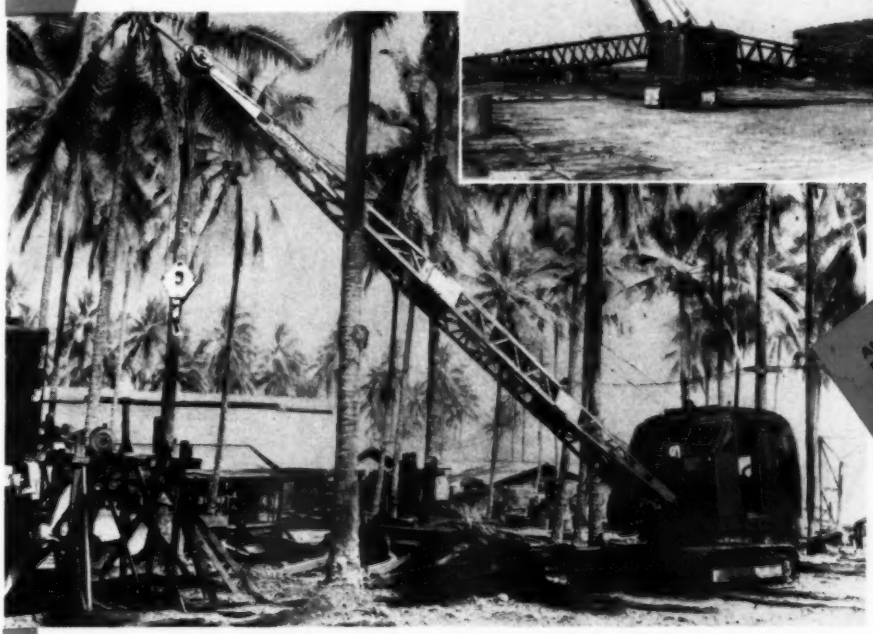
About 45 years' experience on steam, gas, and electric shovels on coal stripping, railroad, state road and quarry work. Married. Willing to go anywhere. Able to make own repairs. Now located in Pa.
Box 9228

TRACTOR EQUIPMENT SERVICE MAN AND DEMONSTRATOR

Must be a good Bulldozer operator, and familiar with operation of tractors and hauling scrapers. Should know welding, and be a good mechanic. Should have a car and be willing to travel. Permanent connection for the right man.
Box 9231

The Buckeye Clipper's *smooth speed* amazed our Allies!





Above: Buckeye Clipper Crane erecting steel framework for hangar somewhere in England. British Combine Photo.

Left: Clipper Crane at Milne Bay, New Guinea. U. S. Army Signal Corps Photo.

American-made power shovels and cranes have been shipped to all parts of the world. Prior to the war, Buckeye was so busy supplying domestic users that few Clippers were shipped abroad. Since the war, however, practically our entire output has gone to battle-fronts around the world. For the first time, many Australians, Russians, Free French, British and others of our Allies have seen how Mevac Vacuum Power Control simplifies power shovel and crane operation.

Reports indicate that they are amazed at the way Buckeye Clippers handle — fast, smooth, positive action that minimizes wear and tear, reducing the need for maintenance. Six small handles operate the vacuum cylinders which control all operations.

Clippers have all of the features of sound engineering design that you expect to find in a modern shovel *plus* exclusive Mevac Vacuum Power Control. They have an enviable war record. A Clipper on your peacetime jobs will insure maximum profits; minimize maintenance costs. Send for a copy of "The Age of Clippers."

BUCKEYE TRACTION DITCHER CO.

Findlay, Ohio

Built by **Buckeye**

Convertible Shovels · Road Wideners · Trenchers
Spreaders · R-B Power Finegraders · Tractor Equipment

TO ADVERTISE: All advertising in this section is payable in advance. Rate: 60c per line, or $7.20 per inch of 12 lines. Minimum charge $2.40. No discounts; no commissions. If no change in copy is desired, three continuous insertions are offered for the price of two. Read these instructions carefully. Each line contains 41 characters (34 characters if all capital letters are used). Count spaces and punctuation as one character each. Allow 10 characters for box number, if blind advertisement is desired. Count your own copy to save delay. Be sure to enclose the correct amount of money with your order. Closing date—15th of preceding month. Example: January issue closes December 15th.

TO INQUIRE: Be sure to address your inquiry to the advertiser by using the correct box number. Mail your letter in care of Excavating Engineer, South Milwaukee, Wisconsin. Write each advertiser a separate letter. Do not write us for name and address of advertiser. This information will not be given out. We have no information about the equipment advertised other than that shown in the advertisements themselves.

MISCELLANEOUS EQUIPT.

7—Allis-Chalmers Speed-Ace
TRACTOR WAGONS
7½ yd. cap.

(Write for illustrated bulletin)

IRON & STEEL PRODUCTS, INC.
13474 S. Brainard Ave. Chicago 33, Ill.

"Anything containing IRON or STEEL"

FOR SALE

Fairbanks-Morse Diesel Engine 210 HP, 360 RPM 6-cylinder, 10" x 12½" Model 44 HD10. Box 3057

FOR SALE

SPARE PARTS FOR 18-B
BUCYRUS REVOLVING STEAM SHOVEL

LAWRENCE PORTLAND CEMENT COMPANY
150 Broadway, New York 7, N. Y.

FOR SALE
DRAGLINE BUCKETS

2—¾ cu. yd. Type AU Light Weight Dragline Buckets.
1—1 cu. yd. Type AU Light Weight Dragline Bucket.
3—1¼ cu. yd. Type AY Heavy Duty Dragline Buckets.
1—1¼ cu. yd. Type AX Medium Duty Dragline Bucket.

BUCYRUS-ERIE COMPANY
Parts Department
South Milwaukee Wisconsin

FOR SALE

Excellent condition REX 34-E dual drum paver complete, serial No. GG149, which was bought new 3-16-44. Box 3056

FOR SALE
WRENCHES

1 with 4½" opening, 3'6" long, very heavy "Williams" like new.
1 3½" opening, 2'10" long heavy "Williams" like new.
1 3½" opening, 2'10" long, all like new, "Williams".
1 3⅜" opening, 3'8" long heavy hand forged.
1 3¼" opening, 2'6" long, heavy hand forged.
1 2" opening, 2'8" long, heavy "Williams."
1 2¼" opening, 2'8" long, heavy "Williams."
1 1⅞" opening, 16" long, heavy "Williams."
Also a lot of solid pipe dies and stocks up to 3" pipe size.
One 1" Metropolitan injector complete—never unboxed.
One 1 pint Detroit sight feed lubricator, complete—never unboxed.
Several 2½" flue rollers and beaders, hand ratchets and drills.
One factory rebuilt 3" "Kunkle" safety valve. Box 3047

FOR SALE

2—Hill rotary pumps 1750 RPM 200 ft. head dir. con. to 40 HP 440 Volt ball-bearing motor. Shafts recently turned. 1—Akins type single screw washer, cap. 40 tons per hour. 1—50 HP Westinghouse motor and starter, 400 volts, 690 RPM.

W. S. Moore Co., Duluth, Minnesota

SURPLUS DIPPERS FOR BUCYRUS-ERIE SHOVELS

2—⅝ cu. yd. Skipper Scoop Dipper—10-B
2—½ cu. yd. Dragshovel Dipper—17-B
3—½ cu. yd. Skimmer Scoop Dipper—17-B
1—⅝ cu. yd. Inserted Type Dipper—16-B
1—¾ cu. yd. Welded Dipper—21-B
1—1 cu. yd. Dragshovel Dipper—29-B
1—1¼ cu. yd. Cast Front Dipper—GA-3
1—1¼ cu. yd. Inserted Type Dipper—30-B, 42-B, 41-B, 43-B, and E-2.
1—1½ cu. yd. Heavy Duty All Cast Dipper—42-B
1—1½ cu. yd. Snow Loading Dipper—10-B
1—2 cu. yd. Rock Dipper—75-B
1—2¼ cu. yd. Inserted Type Dipper—50-B
1—2¼ cu. yd. Inserted Type—55-B
1—2¼ cu. yd. Welded Dipper—48-B
1—2¼ cu. yd. Rock Dipper—75-B
1—2½ cu. yd. All Cast Dipper—55-B
1—2¾ cu. yd. Light Duty Shovel Dipper—54-B
1—3½ cu. yd. Coal Loading Dipper—75-B
1—4 cu. yd. Type IV Med. Duty Dipper—100-B

F.O.B. Works

Write for any further information desired.

BUCYRUS-ERIE COMPANY
Parts Department
South Milwaukee Wisconsin

FOR SALE OR LEASE

Brazil Block Coal stripping proposition on Big Four RR near Clay City, Indiana. Three track tipple with shaker screens and miscellaneous small equipment, ready to operate. Half-million tons of coal owned or under lease and additional acreage available. Excellent proposition for operator having idle stripping equipment and desiring to get into immediate production of coal.

Address C. E. Hines, Worthington, Indiana; Roy E. Price, 411 Indiana Trust Building, Indianapolis 4, Indiana.

LIQUIDATING CONTRACTOR'S PLANT

½ cu. yd. General Backhoe, Shovel and Crane. 105 Northwest Crane and Shovel Combination. Cleveland Backfiller. 2 Ton Crawler Cranes. 65 H.P. Economic Boiler 100 lb. Stock and Fittings (Coal). 18 H.P. Vertical Boiler 125 lb. Pressure, complete fittings (Oil). 2—8000 gal. Tanks—Coils. 5 Portable Compressors. Jack Hammers. R-4 Bulldozer. Sheeting Hammers. Air Hoist, 7 cu. ft. to 28 cu. ft. Gas, Electric and Steam Mixers. Jetting Pumps. Pipe line testing equipment. 2 drum electric hoist. 20 Ton, 10 Ton and 3 Ton Trailers. ¼ cu. yd. to 1½ Buckets, Excavating, Rehandling, Pulpwood, Grapple. Shovel Fronts for ¾ cu. yd. Koehring, ½ cu. yd. Lorain 35, 1 cu. yd. P&H 600. Byers Bearcat Crane—backhoe attachment. 5 Ton Gas Roller—10 Ton Steam. Welding Rods. 2—6 cu. yd. Watson Wagons. 25 Ton—30 Ton Std. Gauge Locomotives; 2—6 Ton 36" Gauge Gas; 2—12 Ton 36 Gauge Steam. Pipe Threading Machines 2" to 8". Complete Concrete Mast and Chuting Outfit. Hydraulic Jacks. Asphalt Heaters. Turnbuckles, Rope Blocks, Large Quantity All Weights Railroad switches, frogs, compromise joints, bumpers. Steel Sidewalk and Curb Forms. Large stock Parson trencher and Cotta transmission spare parts. ALL IN EXCELLENT CONDITION. Equipment Service, Box 75, Valley Stream, New York. Hollis 5-4315.

FOR SALE

2 shovel type motor-generator sets GE good condition, consisting of AC motor, two DC generators and exciter. Location Midwest. Box 3050

FOR SALE

5 New, Goodyear, earthmover tires and tubes at cost.
3 size 1600-20; 2 size 1400-20. 16 Ply. Box 3054

SMALL SHOVELS, CRANES AND DRAGLINES UP TO 2½ YDS.

FOR SALE

1—Bucyrus-Erie ¾ yd. 20-B Shovel, Serial No. 4280 equipped with 3-cylinder Atlas Diesel Engine. Good condition.

Central Iron Ore Corp.
Woodstock, Alabama

FOR SALE

¾ Combination Steam Crane. Bucyrus-Erie Type B. New flues. Perfect condition.
¾ Bucyrus-Erie Type B Shovel. New flues. Perfect condition.
No. 60 Caterpillar, equipped with bulldozer. Located in Detroit. Box 3060

FOR SALE
Three (3) 1¼ cubic yard
Bucyrus-Erie Type GA-2
Combination Machines

Shop numbers 4150, 10269 and 10427 all reconditioned and ready to work, powered with Waukesha Type "WK" 4 cylinder 6¾ x 8 gasoline engines overhauled ready for work. Varying front end attachments available including one standard shovel attachment, one dragshovel attachment and several clamshell, dragline and lifting crane attachments with 40', 45' and 50' booms. Ready for inspection. All located in my yard in Oklahoma City.

Leo Sanders
521 Tradesmen's National Bank Bldg.
Oklahoma City, Oklahoma

FOR SALE

One ⅝-cu. yd. Bay City Tractor Shovel, complete with crowd and lift, dragline and backhoe attachments. Present location French Lick, Ind. Price $3,500. Box 3061

LARGE SHOVELS, CRANES AND DRAGLINES 2½ YDS. AND UP

FOR SALE

Bucyrus 80B steamer. High lift, 48' boom 32' sticks, 2 and 4 yd. dippers, boilers new in 1941. Marion model 36 and two Marion type 7 steamers. Two Vulcan steam engines, 36" gauge saddle tanks, 16 tons. Equipment immediately available.

Benjamin Coal Co.,
Box 74, Carbondale, Pennsylvania

FOR SALE

1—4 cu. yd. steam skid and roller Monighan dragline 100' boom good condition.
1—3 cu. yd. Monighan diesel electric 3T walker dragline 87' boom good condition.
Location both machines Arkansas. Box 3062

FOR SALE

Used 50-B steam shovel; 80-B steam dragline; Class 14 steam dragline; all Caterpillar mounted and now operating. Box 3052

AMERICAN CABLE

FOR EVERY JOB...

TRU-LAY Preformed saves time. Yes, this rope saves time—the most vital commodity in industry, the most important factor in winning the war.

TRU-LAY saves time by reducing the number of shut-downs for replacement. That's because it lasts longer.

It also saves replacement time because it's more flexible and easier to handle. You don't have to seize the ends of **TRU-LAY** Preformed.

It saves time because it's safer. Broken crown wires in **TRU-LAY** lie flat. They don't wicker out to jab hands and cause infection.

All these and many other advantages of **TRU-LAY** come from its being perfectly preformed.

AMERICAN CABLE DIVISION
Wilkes-Barre, Pa., Atlanta, Chicago, Denver, Detroit, Houston, Los Angeles, New York, Philadelphia, Pittsburgh, Portland, San Francisco, Tacoma

AMERICAN CHAIN & CABLE COMPANY, Inc.
BRIDGEPORT, CONNECTICUT

ARMY (E) NAVY

ESSENTIAL PRODUCTS ... TRU-LAY Aircraft, Automotive, and Industrial Controls, TRU-LOC Aircraft Terminals, AMERICAN CABLE Wire Rope, TRU-STOP Brakes, AMERICAN Chain, WEED Tire Chains, ACCO Malleable Castings, CAMPBELL Cutting Machines, FORD Hoists, Trolleys, HAZARD Wire Rope, MANLEY Auto Service Equipment, MARYLAND Bolts and Nuts, OWEN Springs, PAGE Fence, Shaped Wire, Welding Wire, READING-PRATT & CADY Valves, READING Steel Castings, WRIGHT Hoists, Cranes ... *In Business for Your Safety*

BIG DEMAND MAY MAKE POST-WAR DIESELS SCARCE!
ORDER YOURS NOW! USE

Sheppard DIESEL Post-Priority Plan...

One installation demonstrating Sheppard Diesel economy and dependability was described in this advertisement—appearing in the July 3 issue of this magazine.

WHEN THIS WAR ENDS industry will need Diesels . . . plenty of them . . . as promptly as they can be obtained. But this very need for Diesels may make them hard to get.

Protect yourself! Order your Diesels now . . . through the Sheppard Post-Priority Plan.

No Guessing About the Future . . . No Involved Procedure

The operation of the Sheppard Plan is simplicity itself. You're not asked to guess the future. There's no involved ordering procedure.

You simply fill in the coupon at right stating your estimated Diesel needs. Sheppard engineers will make a recommendation suited to your requirements. This recommendation will be accompanied by a post-priority tentative order blank.

Once this order blank is returned, your name is placed on a special preference list. Names on this list will be given first claim on post-war Sheppard Diesels.

As soon as it is possible to place your order in production, Sheppard will notify you *of delivery date. Ten days after receipt of this notice,* your tentative order becomes binding.

Using the Sheppard Post-Priority Plan is simply thinking ahead to safeguard your future. Why risk being unable to obtain Diesels at a time when you may need them critically? Write today for your tentative order blank.

IT COSTS ONLY A PENNY NOW TO BE SURE OF A DIESEL LATER

PASTE COUPON ON POSTCARD

R. H. SHEPPARD COMPANY
105 MIDDLE STREET, HANOVER, PA.

Please have your engineers submit a recommendation for my power needs as specified below. I understand there is no obligation for this recommendation. Also enclose a Post-Priority tentative order blank.

.....H.P. Diesel required for .....

Remarks.....

.....

(IF ABOVE SPACE IS NOT AMPLE, PASTE COUPON ON LETTERHEAD.)

Company .....

Address.....

.....

By ..... Title .....

Sheppard ALL AMERICAN **DIESELS**